AUTOMOTIVE INDUSTRIES
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The Seventeenth Annual Statistical Issue of

AUTOMOTIVE INDUSTRIES

will be published next week

February 23rd

The 1935 issue of the Automotive Year Book will unfold a wealth of information about the industry in all its phases:

World Registrations, Motor Vehicle Production, Marketing Data, Exports, etc.

Specifications of passenger car power plants and chassis, trucks, tractors, bus chassis, stock and marine engines, outboard motors, rear axles, front axles, clutches, gearsets, steering gears, American and Foreign airplane engines, British and Continental passenger cars, American and Continental Diesel and other heavy oil engines.

In addition, the 1935 Statistical Issue will pay tribute to the courage and initiative of the industry as the flag bearer in the march towards a new prosperity, taking the form of a—

Salute to the Automotive Industry!

Look for it! More than ever before, you will find both its editorial and advertising pages of immediate value, and, as usual, you will keep it as your constant book of reference for the year.

AUTOMOTIVE INDUSTRIES

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AUTOMOTIVE INDUSTRIES

Vol. 72, No. 7 ▫ THIRTY-SEVENTH YEAR ▫ February 16, 1935

1,070,000 In First Quarter

Schedule 340,000 For Feb.; Estimate 425,000 in March

by Athel F. Denham
Detroit Editor, Automotive Industries

Production schedules topping 340,000 for the short month of February and between 415,000 and 425,000 for March provide a first quarter goal for the industry of roughly 1,070,000 cars and trucks for the United States and Canada, an output exceeded only in 1926 and 1929.

Unless labor disturbances should prevent, there is but little question that this goal will be reached, and there is a probability it might be surpassed.

Compared with last year the aforementioned total represents a gain of about 43 per cent in production for the first quarter, and is considerably less than that percentage below the biggest first quarter the industry has ever had. By months, compared with last year, January showed a production gain of roughly 90 per cent, February of 41 per cent, and March should show at least a 25 per cent increase. The declining percentages, of course, are due to the low schedules in the early months of last year with new models delayed by

(Turn to page 200, please)

Robert C. Graham
Who appeared for the AMA before a Senate Subcommittee this week and opposed the 30-hr. bill

AFL Plans International Automotive Union Setup

A plan to discontinue the local "federal" union arrangement among automotive union workers and substitution of the international union system, as now prevails among the mine workers, carpenters, bricklayers, etc., has been proposed by the executive council of the American Federation of Labor and will be submitted to the present federal unions for approval as soon as possible. William Green, Federation president, announced the council plan following a meeting in Washington this week.

If the council's plan carries with present A. F. of L automotive workers the international union plan set-up will be self-officered, self-administered and the individual local groups will be responsible to the international officials rather than directly to the A. F. of L. chiefs as is now the case. This move to charter the locals under an international set-up is in line with the resolutions adopted at the Federation's convention in San Francisco last fall.

Present plans also call for an intensive

(Turn to page 200, please)

Non-Partisan Labor Boards Urged by NLRB

Section 7a cases should be handled only by non-partisan boards such as those in the steel, textile and petroleum industries, the National Labor Relations Board said in a report issued this week. The decisions of such industrial boards should be subject to review by the NLRB, that agency believes.

Senators Told 30-Hr. Law Would Lower Living Standards, Cause "Buyers Strike"

Enactment of a 30-hour week law would limit the ability of the American workman to make a decent living; increase the cost of the product to the consumer and possibly precipitate a "buyers strike" in this country, and defeat what progress has been made in getting men back to work, Robert C. Graham, vice president of Graham-Paige and AMA director, told members of the Senate Judiciary Sub-Committee Wednesday. Mr. Graham appeared before the Senators as representative of the AMA to record the association's opposition to the Black Bill.

Mr. Graham pointed out that the automotive industry has taken a leading part in the Roosevelt recovery program and told the Senators that passage of such a bill would seriously impair, if not defeat the progress already made in getting men back to work.

Mr. Graham's remarks, in part, follow:

"Our whole program in the motor industry has been one of providing the buyer with a better product at a lower price. It is because of ability to do this that we have been able to increase our sales from a low mark of 1,472,000 in 1932 to 2,900,000 in 1934, with an anticipated production of 3,500,000 in 1935.

"If we are now forced to pass on new costs to the consumer, we will not only face a 'buyers strike' in this country, but our export trade, which last year provided 120,000,000 man-hours of labor for American workers will be seriously crippled.

"As men who are intimately familiar with the views of our workmen, we do not believe that the average American wants his hours of work limited. What he really wants is the opportunity to earn more money, and only as he gets that opportunity can his family have the things they want. . . . If we now force him to lower standards of living, we not only deprive him, but we will decrease employment because men must earn more than a subsistence wage if there is to be a real market for American labor."

President Squelches Rumors of Changes in Code and ALB Prior to Expiration

WASHINGTON — In the midst of many rumors as to early and widespread changes impending in the automobile code and the industry's labor relations, it has been made clear by President Roosevelt that the code as amended last week and the Automobile Labor Board will stand as they are until June 16. On that date both the code and the National Industrial Recovery Act expire. It is certain the act will be continued, as proposed by the administration. What may be done with respect to the code after that date remains to be seen.

Reports which gained quick circulation implied that, in the face of the code's and the ALB's termination date, the former was in for drastic changes in the immediate future and that the ALB, which the President has called his "baby," would be abolished. The rumors grew out of the NRA Research and Planning Division report on the automotive industry. Its bitter strictures regarding the espionage, speed-up and stretch-out systems, etc., and its thinly veiled attack on the Wolman board were used as the basis for reports of early changes in the code and abolition of the board, reports that have been laid low by the White House statement which means the administration naturally proposes to live up to its contract to make no change in the board set-up and no further changes in the code prior to their termination.

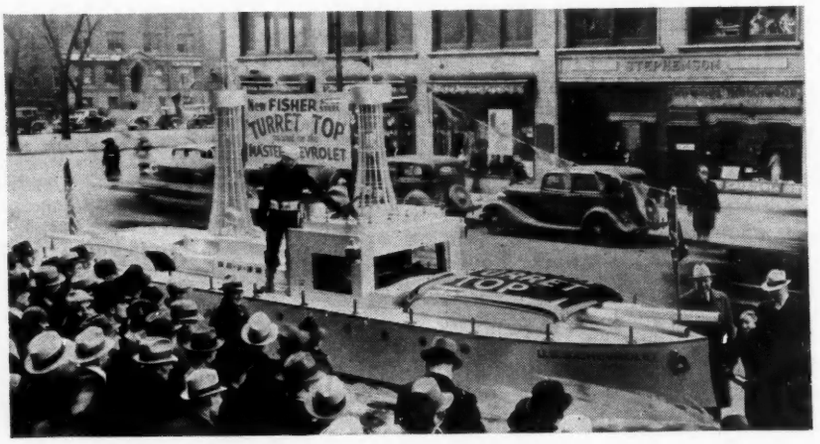
Repercussions from the NRA Research and Planning Division report, however, were reflected by high officials of NRA, who indicated changes would be made in the industry. Indicative of this attitude was the declaration of W. Averill Harriman that "there is no doubt that sweeping changes are needed in the automobile industry."

Mr. Harriman took objection to interpretations that the President had not adopted recommendations of the NIRB made in the board's letter to the President which accompanied the Research and Planning Division report. He contended that the board's suggestions were accepted generally, but pointed out that it had not set a time for adoption of the report. Occasion was taken by Mr. Henderson to make a distinction between the Henderson report and the board's recommendations. The board to a man, Mr. Harriman said, is back of the President in his action extending the code. The only board recommendation, however, which actually has been effectuated so far by the President was for bringing out new models in the fall. The industry itself had previously made a study to that end and was favorable to the plan, and made a report on it. Mr. Harriman said that "it is obvious there will be a review of the auto code before the next production season."

By some it has been suggested that the industry itself might see fit to make changes on its own initiative in the code if it is continued, depending upon developments showing how it operates in its present form. As to labor relations, it is clear that the American Federation of Labor, warm in its praise of the Henderson report, will seek to have the ALB abolished and no doubt it will find at least considerable NRA support in this direction, judging from that report. The report affected to have faith in the ALB, yet it gave it the praise that damns by saying the board had not solved the industry's problem, as though any other labor board has solved the problems of any other industry. In view of the fact that the President set up the ALB and claims it as his own its abolition would seem strange.

Yet the Henderson report and the NIRB recommendation for an industrial board to represent the automobile and the parts industries possess strength in that it is suggested such a board be set up under Congressional resolution 44 under which the President created both the National Labor Relations Board, the Steel Labor Relations Board and the Textile Labor Relations Board, the two latter boards having the same personnel. These boards are made up of impartial members, connected with neither industry nor labor. The ALB is made up of one representative each of labor, industry and the government.

Meanwhile it is clear that organized labor will intensify its efforts to have the board abolished and the code greatly modified once their present life expires. President Green of the A. F. of L. in lauding the Henderson report as supporting the Federation's position said that what the automobile industry needs is a statutory board giving automobile workers the same rights which workers in other industries enjoy. The target at which Mr. Green was directing his fire is not clear. Presumably, however, he had in mind the idea of majority representation provided under the plans of other government labor boards as against the proportional representation plan of the ALB. Under existing conditions, however, organized labor would have no representation whatsoever in the automotive industry if it insisted upon the majority representation plan.



After firing a 21-gun salute, the battleship Chevrolet makes fast alongside the General Motors building at Detroit. The craft carries armor plating of heavy tin, and is powered by a 157-inch Chevrolet 1½-ton truck chassis. The main battery is protected under two all-steel Fisher-Chevrolet turret tops. Miss Dorothy Neddermeyer formally christened the ship in the presence of Chevrolet and Fisher Body officials. Left to right in the group back of the fair sponsor are F. A. Hoel, Detroit city manager, and W. E. Graveson, Detroit zone manager, representing Chevrolet; and E. F. Fisher, general manager of Fisher Body Corp.

Campbell Sets New Class C Records in Hudson Sedan

New flying start, Class C (183-305 cu. in displacement) records for one mile, five miles, one kilometer and five kilometers were hung up at Daytona Beach this week by Sir Malcolm Campbell, driving a Hudson sedan. The new one mile record is 88.202 against the former mark of 86.295 m.p.h. The other new records are:

Five miles	88.051	against	86.237 m.p.h.
One kilometer.	88.206	"	86.068 m.p.h.
Five kilometers	88.102	"	86.057 m.p.h.

Buddy Marr, also driving a Hudson, lifted the standing start one mile record from 67.969 to 68.188. Marr, in addition, set a speed record in second gear of 69.224 m.p.h. as compared with the previous mark of 62.521 m.p.h.

Hearing Dates Named for Eastman Regulatory Bills

Hearings on the transportation bills drafted by Federal Coordinator of Transportation Eastman, will begin Tuesday afternoon, Feb. 19, before a sub-committee of the House Committee on Foreign and Interstate Commerce. Hearings before the Senate Committee are scheduled to begin Feb. 25. It has not been revealed which of the Eastman bills will be considered first, but it has been strongly indicated that the bill providing for regulation of interstate motor carriers would get attention first.

Thorp Heads NRA Study of Effects of Differentials on Marketing Channels

A special inquiry of existing and proposed code provisions dealing with distribution differentials affecting the channels through which goods flow from manufacturer to retailer has been authorized by the National Industrial Recovery Board.

The inquiry will be made by Dr. Willard L. Thorp, chairman of the Advisory Council, with the assistance of Wroe Alderson, Washington research analyst; L. F. Boffey, of the Consumers Advisory Board staff; Milton Katz, Advisory Council legal department; C. A. Pearce, Division of Research and Planning, and R. S. Rauch, Industrial Advisory Board and Advisory Council.

"The problem of distribution differentials has become important," Dr. Thorp says, "because of the acute competition between jobbers and manufacturers who sell direct to retailers, or between jobbers and mass distributors, or between long-established agencies of distribution such as jobbers or brokers and novel or special agencies of distribution such as truckers or cooperatives."

After completing its study of the problems and investigating proposed solutions, the special committee will report its recommendations to the National Industrial Recovery Board.

After pointing out that in several cases one step in distribution is bound by code restrictions which do not apply to other steps distributing the same goods, with the possible result that a new situation of unfair competition may have been created, Dr. Thorp outlined the four main purposes of the inquiry as follows:

1. To examine the nature of the alleged unfair methods of competition in this general field.
2. To consider the relevance of present code provisions to the basic problems as they appear.
3. To determine the degree to which devices now in codes are or are not operating in the public interest.
4. To formulate a definite policy for action.

A. R. Glancy Appointed

A. R. Glancy has been appointed chief of the committee on construction and decentralization of the Business Advisory and Planning Council, according to an announcement by H. R. Kendall, chairman of the Council.

Mr. Glancy was at one time president of the Oakland Motor Co. and a vice-president of the General Motors Corp. Recently he has been active in NRA.

Other prominent business men and industrialists are being invited to serve on Mr. Glancy's sub-committee. Upon the recommendation of the Council, President Roosevelt has been requested to set aside $2,500,000 for decentralization experiments.

Goodrich Names Gundaker Head of Accessories Dept.

Guy Gundaker, Jr., for the last four years manager of the sales promotion division of The B. F. Goodrich Company advertising department, has been named manager of the newly created Goodrich automotive accessories department, it is announced by C. B. O'Connor, general tire sales manager.

E. R. Bell will be manager of the tire accessories division, and W. C. Roberts, manager of the battery division of the new department.

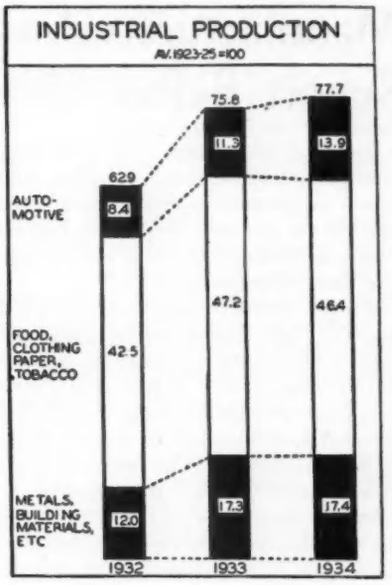
Frank J. Rees, formerly assistant to Gundaker, has been appointed sales promotion manager by P. C. Handerson, Goodrich advertising director. E. A. Hughes, until February 1 representative of Goodrich sales promotion in the Albany, N. Y., district, succeeds Mr. Rees.

Phila. to Have Clinic

The Fifth Annual Automotive Maintenance Demonstration sponsored by automotive jobbers in the Philadelphia area, with the cooperation of Shop Equipment Associates, will be held at 401 N. Broad St., Phila., on March 5, 6, 7 and 8.

Shop Equipment Exports

Exports of automobile tire service equipment were valued at $223,238 in 1934. The nation's foreign sales of pumps for gasoline and oil last year were valued at $582,628, and all other automobile service equipment at $1,655,254.



The Increase in industrial production in 1934 was due entirely to the automotive industry, according to this chart from the Business Bulletin of the Cleveland Trust Co.

Final Franklin Payment To Creditors Reported

A final payment of $224,656 to creditors of the H. H. Franklin Mfg. Co. is reported to have been ordered by the referee, Ben Wiles. The payment is said to represent the balance remaining from the trustee's sale of the company's assets, after expenses and taxes. Franklin Motors, Inc., the principal creditor, it is said, will receive $203,750. The payment is reported to represent a little over 10½ per cent of approved claims totaling $2,130,305.

GM Has Best January Since 1930; U. S. Sales Are the Largest in Four Years

Total sales of cars and trucks by GM's passenger car divisions in January were the largest for that month since 1930. Sales both to dealers and consumers in the U. S. were the best since 1931.

January sales to dealers in the U. S. and Canada, plus overseas shipments, amounted to 98,268, more than double the December figure of 41,594, and 57 per cent larger than last year's January total of 62,506.

Domestic retail sales in January numbered 54,105, against 41,530 in December, and 23,438 in January, 1934.

Dealers in the U. S. bought 75,727 units last month as compared with 28,344 in December, and 46,190 a year ago. The indicated increase in domestic dealer stocks is 21,622 for the month.

Overseas sales of GM cars and trucks from all sources in January total 19,167 units, an increase of 86 per cent over the corresponding month, 1934, and the highest January sales ever recorded. American-source sales alone showed an increase of 123 per cent over a year ago with the heaviest gains recorded in the South American, Far Eastern, Australasian and South African markets.

General Motors sales of its Vauxhall and Bedford products, manufactured in England, and of the Opel car and Blitz truck, manufactured in Germany, are reported also to have shown encouraging gains in January in the highly-protected countries in which they are produced.

Manufacturers Await Complete NRA Report Before Drawing Conclusions

Detroit — Very few manufacturing executives have read the complete NRA report on automotive employment conditions as yet and as a result are hesitant about expressing their views on the basis of published summaries.

Many executives are not convinced that the fall announcement plan will make it necessary for dealers to carry heavier winter stocks. It is also felt in some quarters that while some sales will be transferred from spring to fall, fourth quarter business will be borrowed to a certain extent from the third quarter.

Several executives express the view that the plan may enable manufacturers who desire to do so, to get away from annual announcements.

There is general disagreement with the report's conclusion that there are too many dealers. It is pointed out that generalizations on this point are not possible and that some dealers who are listed as such, are not really dealers, selling only one or two cars a year. (A survey of 2850 Pennsylvania dealers shows that 628 sold only one or two cars in 1934.) Such small operators are in little towns, but in the cities, the manufacturers say they can't get dealers with enough capital to swing the business if the number were reduced.

As to car company parts buying policies, which were criticised in the report, the parts makers, of course, would like to get better balanced purchasing through the year as their peaks and valleys of production correspond almost exactly to those of the car makers. However, parts makers are not counting greatly on the possibility that car makers will place materially larger orders in advance of final assembly.

On two major criticisms in the report there is some tendency to agree partially with the viewpoints expressed in the report. This applies particularly to the security of employees. Manufacturers believe that job security should be increased by reducing the amount of temporary labor and by stretching out the work year. On the speed-up, it is pointed out that when new models are put in production inequalities always exist which are ironed out in time. In the meantime only those who have a grievance even if temporary will complain to an investigating committee. Those who are satisfied naturally don't appear and the investigation therefore is bound to be one-sided. The significance of this comment lies in the fact that the investigation was made at a time when the industry was putting its new models into production.

R.F.D. Carriers Want Horseless Carriages

Car Able to Take Bumps, Give Wide Clearance Need

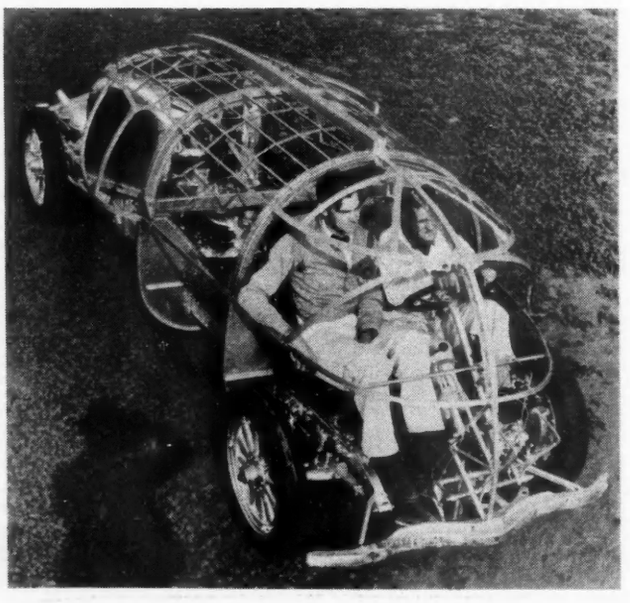
While American automotive engineers are lying awake nights in their efforts to design a streamlined motor car as low to the ground as a kiddie car, another group of workers is designing a motor car for their own use which will resemble the old high-wheeler in which grandfather courted grandmother, according to the Low Cost Roads Association.

This group is the National Rural Letter Carriers Association whose members travel approximately 1,360,000 miles a day over the rural mail routes. The need of the rural letter carriers, according to W. G. Armstrong, president of the Association, is not for "streamline beauty with a top speed of 100 miles an hour and a few inches of road clearance" but for "a good substantial piece of machinery, able to take the bumps, a top speed of perhaps thirty miles an hour and with several feet of road clearance."

"Most of these rural, farm-to-market roads we have to use," says Mr. Armstrong, "are unimproved dirt, full of ruts, bumps and deep ditches and virtually impassable many months of the year. The new streamlined jobs with their high speeds and shiny gadgets are very nice on the improved highways but useless in most of our territory.

"What we need is the old time 'horseless carriage' with its axle several feet from the ground so it will not drag—or better still a program of low-cost improvements on the rural roads. A bituminous surface treatment, in a majority of cases, would prove ample to take our jobs out of the mud."

Approximately 80 per cent of America, the letter carriers point out, is still in the mud so far as roads are concerned.



A rear engined job built by Allen M. Hoppe and Allen F. Streut, shown in the car, and demonstrated recently in Hollywood. It is 16 ft. long and 7 ft. wide, and seats six passengers. Limited production is reported to be contemplated.

Manufacturers May Protest Wholesale Code Assessment

Manufacturers receiving a notice of assessment from the code authority for the Wholesale Automotive Trade, are advised in a bulletin issued by the APEM, that they are entitled to protest this assessment on the grounds "that the basis of assessment as approved is unjust as applied to said firm or that it is not being followed in the particular case, or on any other valid grounds. Any such protest filed by a firm must be accompanied by supporting facts."

The bulletin points out that if a company does no wholesale business or if it feels that the assessment is unfair, that it is imperative that a protest be filed with the Contribution Section, Compliance Division, NRA, Washington, within 15 days of the receipt of the notice.

Finance Company Enjoined

The General Finance Company was permanently enjoined on February 4 by the District of Columbia Supreme Court from violating provisions of the Motor Vehicle Retailing Trade Code relating to selling cars for resale to other than enfranchised dealers, according to NRA.

Steel Output Is Lower But Auto Demand Holds

Some Forward Buying Is in Evidence—No Change in Price Levels Likely

Although the rate of steel ingot production, following its steady, three-months' climb, was reported by the American Iron and Steel Institute to have eased off this week to the extent of about 4 per cent, automotive demand is well maintained.

Incoming specifications are reported for the most part to replenish what gaps are being made in backlogs by shipments. Detroit district mills continue to operate at capacity and in other districts there has been no diminishment in the production rate of mills that cater primarily to automotive consumers.

It is sensed that specifications from both automobile manufacturers and parts makers are somewhat more in anticipation of future needs than they were a month ago, but such covering, extending at the most into April, can hardly be called stocking. Buyers just do not want to have assemblies retarded through failure of this or that shipment of steel to reach them on time. As a result, nearly all sheet finishing mills are booked to the full extent of their ability to make shipments up to March 31, the last day on which first-quarter shipments are permitted under the code. This may prove to be merely a nominal restriction, as so far second-quarter price changes are looked upon as a possibility, but not a probability.

While pressure on strip mill capacity is not as high as it is on sheet mills, demand is well maintained, a good many plants operating four-fifths of capacity. Cold-finished steel bars and automotive alloy steels also continue to move into consumption at a good rate. This is true as well of wire rods and their secondary product, automobile bolts.

Pig Iron—Blast furnace interest report better demand for malleable iron. A good many sizeable inquiries, ranging up to 1,000 tons, overhang the market. Some furnaces are shipping at a higher rate than they are producing. Prices are unchanged.

Aluminum—Automotive demand continues good for both primary and secondary metal and alloys. The market is firm. A report by the Division of Research and Planning of the National Industrial Recovery Board on the Aluminum Code, which must be renewed before June 16, is looked for this week.

Copper—Domestic demand for "Blue Eagle" electrolytic copper is somewhat better. Prices are unchanged.

Tin—Unsettlement of the London market as the result of difficulties of London brokers, caught in the upheaval in pepper speculation, retarded business here as well. Spot Straits tin is still in scant supply, opening the week at 50¾ cents, while futures command only 50¼ cents.

Lead—One of the leading markets quotes $1 per ton higher than others, and reports sales at that level, 3.55 cents, New York.

Zinc—Dull and steady.

Athel F. Denham
Who inaugurates his own technical advisory service

Denham Launches Technical Advisory Service in Detroit

Athel F. Denham has resigned as Detroit Editor for *Automotive Industries* and other Chilton publications, and has established a technical advisory service on automotive advertising and publicity with headquarters at 1235 Lafayette Building, Detroit.

The object of the service, according to Mr. Denham, is to interpret technical developments in the light of marketing needs, functioning as a liaison between engineering, and advertising and publicity divisions. The service is designed for automotive concerns selling to the public and to the industry, either for original equipment or through jobbers and dealers, and for non-automotive companies desiring to reach the automotive industry with their sales message.

Mr. Denham, a mechanical engineer, joined the Chilton editorial staff in 1925 and during his connection with that organization earned for himself a wide reputation as a writer on automotive news, engineering, production and merchandising.

Hartley Promoted by Link-Belt Co.

William L. Hartley has been promoted to the managership of foundry equipment sales of the Link-Belt Company, with headquarters in Chicago. Mr. Hartley was formerly manager of the company's Detroit office and he is succeeded in that position by Harold L. Hoefman, formerly manager of the Indianapolis branch.

Richard B. Holmes, of the St. Louis office, succeeds Mr. Hoefman at Indianapolis, while Carl A. Blomquist, of Chicago, succeeds Mr. Holmes at St. Louis, where he will assist Howard L. Purdon, manager.

Lansing AFL Meeting Asks Industry Probe

Strike Action Is Opposed Until After AFL Conference Set for Feb. 23 in Detroit

Resolutions condemning the automobile labor board and asking for its abolition and endorsing a proposal in Congress for an investigation of the automobile industry, were adopted at a meeting staged by the American Federation of Labor in Lansing last Sunday. Attendance totaled over 800.

The meeting, which grew out of the Lansing Fisher Body plant controversies, was addressed by Francis J. Dillon, general organizer for the A. F. of L. assigned to the automobile industry, who told the workers the Federation opposed any strike action until after a conference to be held in Detroit February 23. Most of those present were Fisher plant employees.

The Federation pledged financial support to the wet sanders who walked out at the Fisher plant on January 30 and 31, and indicated that their case would be brought up at the Detroit conference. The sanders, whose places have been filled by new men, are affiliated with the A. F. of L. The Fisher management informed them last week that they would not be returned to work but could apply for employment the same as others.

The workers Sunday acted on Dillon's suggestions and plans were made for an intensive membership drive in the local automobile plants, which will be climaxed February 21 and 22 by the visit to Lansing of William Green, president of the American Federation of Labor.

In his talk Dillon accused the automobile labor board of being controlled by "Ed Fisher and his crowd."

Lansing Employment Up

Employment in Lansing's industrial plants, chiefly automotive, averaged 14,133 in January, the largest total for any month since June of last year, according to the monthly report of the Chamber of Commerce. More than 8,500 of the total are on the Oldsmobile and Fisher Body payroll, while Motor Wheel and Reo account for another 4,000.

The average for January was nearly double that of November, 1934, and showed a gain of nearly 4,000 over the same month of last year. Last year's peak of 15,163, reached in May, will be reached in February, observers believe.

Morgan Reelected

Thomas A. Morgan, president of the Sperry and Curtiss-Wright Corps., has been reelected president of the Aeronautical Chamber of Commerce of America, Inc.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

The improvement in general business continued last week, although some branches were adversely affected by the uncertainty attending the deliberations of the Supreme Court regarding the gold clause. Retail business was aided by the more favorable weather, and wholesale trade showed further gains. Business failures throughout the country were fewer in number.

Carloadings Gain

Railway freight loadings during the week ended Feb. 2 amounted to 598,164 cars, which marks an increase of 42,396 cars above those in the preceding week, an increase of 32,763 cars above those a year ago, and an increase of 112,105 cars above those two years ago.

Food Prices Up

Retail food prices during the two weeks ended Jan. 15 increased by 2.2 per cent, according to the Bureau of Labor Statistics. The current index stands at 118.5 based on the 1913 average as 100, against 115.9 on Jan. 2 and 105.2 a year ago. The increase in the meat group during the two weeks under review amounted to 7 per cent.

Power Output Larger

Production of electricity by the electric light and power industry in the United States during the week ended Feb. 2 amounted to 7.7 per cent above that in the corresponding period last year.

Bigger Payrolls

According to the Bureau of Labor Statistics, December factory employment increased 1.7 per cent, and payrolls advanced 6.2 per cent. The level of employment in December was 5 per cent above that a year ago, while payrolls were 16 per cent higher.

Oil Production Down

Average daily crude oil production for the week ended Feb. 2 amounted to 2,448,000 barrels, as against 2,542,000 barrels for the preceding week and 2,121,650 barrels a year ago.

Soft Coal Gains

Production of bituminous coal during the week ended Jan. 26 amounted to 8,250,000 tons, which marks an increase of 6.3 per cent above that during the preceding week and is the highest reported for any week since March, 1934.

New High for Prices

Professor Fisher's index of wholesale commodity prices for the week ended Feb. 9 stood at 81.7, as against 81.6 for both the week and two weeks before. The current figure is the highest since the week ended Nov. 9, 1930.

Bill Holdings Decrease

The consolidated statement of the Federal Reserve banks for the week ended Feb. 6 showed a decrease of $1,000,000 in holdings of discounted bills. Holdings of bills bought in the open market and of government securities remained unchanged.

Defiance Spark Plug Corp.

Defiance Spark Plug Corp. reports a net loss, after charges, of $61,629 for the year ended November 30, 1934, against a loss of $79,427 in the previous fiscal year.

The November 30 balance sheet shows the following current position:

	1934	1933
Current assets	$395,693	$480,865
Cash	64,464	67,923
Current liabilities	25,765	35,079
Working capital	369,928	445,786

Libbey-Owens-Ford

Libbey-Owens-Ford Glass Co., with labor difficulties apparently settled for the remainder of 1935, reported that its business volume was greater in 1934 than 1933 but its net earnings declined due to higher labor costs and competitive market conditions.

Payrolls increased $1,903,706 last year while net earnings slumped $1,038,710 compared with the previous year. Net earnings were $3,161,831 compared with $4,200,542 the previous year.

The balance sheet showed the company ended 1934 with $2,765,713 cash and $3,087,395 of United States securities. Current assets were $11,690,604 against $1,690,913 of current liabilities. Last year 27,700 shares of common stock were purchased and retired. Average price was $25.66.

President Biggers reported 47 new patents were granted in 1934 and 115 others pending. All are carried at zero in balance sheet.

Black & Decker Mfg. Co.

Black & Decker Mfg. Co., Towson, Md., reported a net profit of $325,533 for 1934 at the annual meeting of stockholders held last week. S. D. Black, president of the company, made the report and said the net profit was realized after allowance had been made for all charges including federal taxes. Mr. Black also announced that the company's business in the fourth quarter of last year showed a 109 per cent increase in net profits and a 31.2 per cent increase in sales over the corresponding quarter of 1933.

Lycoming Mfg. Co.

Lycoming Mfg. Co. reports a net loss, after charges, for the year ended November 30, 1934, of $442,540, against a loss in the previous fiscal year of $592,996. Preferred dividends, amounting to $68,328, raised the 1934 deficit to $510,868.

The current position of the company as shown by the November 30 balance sheet is as follows:

	1934	1933
Current assets	$2,050,679	$1,606,348
Cash	79,953	63,586
Receivables	172,365	136,480
Due from affil.	682,130	.....
Inventories	1,116,231	1,406,282
Current liabilities	126,918	187,545
Working capital	1,923,761	1,418,803

Western Auto Supply

Western Auto Supply Co. reports January sales of $1,114,000 against $870,000 in the corresponding month last year.

GM Fund Distributes $11,000,000 Savings

30,000 Workers Share in Melon; Average is $366.66 Per Employee

A distribution of nearly $11,000,000 was made last week to approximately 30,000 GM employees through the General Motors Savings and Investment Plan, an average of $366.66 per employee, according to Alfred P. Sloan, Jr., corporation president.

This latest distribution was from the savings accumulated under the plan through contributions both by employees and the corporation in 1929. Employees who in that year deposited $25 per month, the maximum allowed under the plan, received $621.52, representing the monthly deposit plus benefits contributed by the company and $114.35 interest. For every dollar saved by the employee under the program GM contributes 35 cents.

In announcing the distribution, Mr. Sloan referred to the proposals of President Roosevelt for greater social security, saying he was convinced it was the duty of all branches of industry to recognize more and more the importance of providing greater social security for workers, not only from the sociological standpoint but also in industry's own interests.

"From the time the plan was put into effect" (16 years ago), Mr. Sloan said, "the distribution to employees covering both maturity and interim settlements, has aggregated $215,000,000, of which $126,000,000 represented employees savings and the balance of $89,000,000 interest and Investment Fund credits paid by the corporation."

Toledo a Quiet Sector After Raises in Wages

12,000 Workers Share $1,250,000 Increase in Annual Pay Total

Toledo's automotive workers are at peace now and many have received wage increases in the last few days.

Following the completion of negotiations by which the Electric Auto-Lite Co., granted its workers a flat 5 per cent increase and some adjustments which gave workers in some of the lower brackets a boost of 7 per cent or more, the Moto Meter Gauge & Equipment Co., subsidiary, announced a voluntary increase of 5 per cent with some additional adjustments.

Previously the Spicer Manufacturing Corp., with 2,100 employes, had granted substantial increases including a flat 5 cents an hour and an additional 5 per cent for all under 54 cents an hour. Libbey-Owens-Ford Glass Co., also had granted a 5 per cent boost with an added 2 per cent in general adjustments.

The Toledo Steel Tube Co. signed a contract for 5 per cent increase in all hourly rates.

Effective yesterday the Toledo Steel Products Co. also announced a 5 per cent increase made voluntarily.

Practically all the contracts provide for the 40-hour, five-day week and run to Dec. 31, 1935. Most of them carry time and a half for overtime.

T. N. Taylor, organizer for the American Federation of Labor, who has been in Toledo for several weeks assisting the United Automobile Workers Federal Union No. 18,384, has declared that the peaceful settlements of many negotiations here made Toledo the most peaceful of all automotive centers.

More than 12,000 workers in the plants have achieved a wage boost of about $1,250,000 for the remainder of the year by way of the new contracts.

Hourly rates are now practically on a level with the peak of 1928-29 but workers are on shorter hour basis.

Radiator Code, APEM Supplement, Approved

The National Industrial Recovery Board has approved the radiator manufacturing industry code, an APEM supplement. This code becomes effective Feb. 11. The supplement contains control provisions covering destructive price cutting, emergency price fixing, commercial bribery, inaccurate labeling, trade mark imitating, inaccurate advertising.

In addition separate schedules of trade practice rules, including those covering maximum discounts and terms of sale, are established for each two classes of industry members, those manufacturing primarily for original equipment and service replacement and those selling to customers other than buyers of original equipment.

Summer Meeting at White Sulphur

The 1935 Summer Meeting of the Society of Automotive Engineers will be held at White Sulphur Springs, June 16-20.

Employment Reaches Peak at Young Radiator Co.

Employment at the Young Radiator Co. has reached the highest peak of any time within the last three years, according to an announcement by F. M. Young, president. Facilities for the manufacture of radiators and heat transfer apparatus have recently been extended by the addition of 40,000 square feet of floor space.

Timken Promotes Robinson

John A. Robinson, formerly in charge of the Dallas, Texas, office of The Timken Roller Bearing Co., has been transferred to the automotive division and appointed district manager of that division with headquarters at the Chicago office. H. W. Trump succeeds Mr. Robinson at the Dallas office.

Big Expansion in Motor Plant Working Forces

Expanding automotive production in December is reflected in the sharp increase in the accession rate in automobile plants reported by the Bureau of Labor Statistics for that month. The accession rate was 27.48 per 100 employees, against 17.30 in November, and 18.26 in December, 1933.

The following table compares monthly turnover rates per 100 employees in automobile plants with similar rates for manufacturing plants generally:

	Automobiles	All Manufacturing
Quit	1.31	.58
Discharge	.33	.15
Lay-off	2.27	2.72
Total separation	3.91	3.45
Accession	27.48	6.14

Zorn, Consultant Welding Engineer at Dockson Co.

C. H. Dockson Company of Detroit announces that William Zorn, formerly welding engineer for the Detroit Edison Company, joined its organization in the capacity of consultant welding engineer on February 1.

During his association with the Detroit Edison Company he was in complete charge of all welding operations, one of his recent achievements being the completion of welding the main steam lines of new units which operate at 650 lb. pressure and 850 deg. F. superheat.

Industry's 1934 Exports Increased 110% in 12 Month Period Over 1933

	Twelve Months Ended 1934		1933	
	Number	Value	Number	Value
Automobiles, parts and accessories	....	$190,208,413	....	$90,631,378
Motor trucks, buses and chassis (total)	92,723	44,207,307	43,616	20,112,818
Under one ton	9,576	3,158,847	4,779	1,401,346
One and up to 1½ tons	71,649	30,168,555	32,325	12,386,326
Over 1½ tons to 2½ tons	9,340	7,552,339	4,941	4,027,792
Over 2½ tons	1,763	3,078,562	1,306	2,157,339
PASSENGER CARS				
Passenger cars and chassis	145,157	78,258,000	64,511	32,100,012
Low price range $850 inclusive	133,417	65,363,798	59,694	26,734,171
Medium price range over $850 to $1,200	7,753	7,482,877	2,660	2,543,486
$1,200 to $2,000	2,018	3,063,008	1,087	1,600,844
Over $2,000	726	1,873,678	333	866,736
PARTS, etc.				
Parts except engines and tires	....	....	....	....
Automobile units assemblies	....	36,247,289	....	18,348,113
Automobile parts for replacement (n.e.s.)	....	21,916,877	....	13,672,763
Automobile accessories (n.e.s.)	....	2,587,619	....	1,576,567
Automobile service appliances	....	2,416,042	....	1,048,705
Airplanes, seaplanes and other aircraft	490	8,195,484	406	5,391,493
Parts of airplanes, except engines and tires	....	4,860,567	....	2,249,172
INTERNAL COMBUSTION ENGINES				
Stationary & Portable:				
Diesel and semi-Diesel	155	478,632	45	162,138
Other stationary and portable:				
Not over 10 hp.	6,311	391,904	3,712	218,171
Over 10 hp.	1,129	633,629	780	378,569
Automobile engines for:				
Motor trucks and buses	4,142	544,906	2,180	289,949
Passenger cars	22,005	1,399,471	19,397	1,173,346
Aircraft	1,009	4,458,701	2,903	1,452,341
Accessories and parts (carburetors)	....	1,355,977	....	961,273
IMPORTS				
Automobile and chassis (dutiable)	585	175,851	533	297,873

1,070,000 In First Quarter

(Continued from page 193)

labor troubles in the tool and die industry.

From present indications it would appear that April should set the peak for the first half of the current year. Whether or not it will be exceeded later, will depend largely on retail delivery developments.

On individual company reports, both Pontiac and Oldsmobile have reached new high production levels, with Pontiac having several 800-car-days during the past week. Oldsmobile also reached its first 800-car-day in its long history last week, setting a new record for that company. The previous high daily production mark was 709 cars on April 26, 1929.

Graham reports production schedules of 4329 cars for the month of February, compared with 1981 in January, the highest schedule that company has had for any one month in more than five years.

Chrysler reported 496 airflows and airstreams delivered during the week ending Feb. 9, bringing the total for the last six weeks to 2371 cars, exceeding totals for the same period of 1933 and 1934 combined.

Domestic retail deliveries of Ford V-8 cars and trucks for January totaled 75,678 units, an increase of 110 per cent over deliveries for the same month of 1934, according to the Ford Motor Company. This is the highest total for any January in the past five years and also exceeds the months of January and February of last year combined. Deliveries in January this year were exceeded in only April, May and June of last year, which are usually considered the peak months of the spring selling season. Retail deliveries of Ford V-8 trucks were higher than for any January since 1925. Present production of Ford V-8 units is in excess of 5,000 daily.

AFL Plans International Automotive Union Setup

(Continued from page 193)

drive for membership within the industry culminating in a mass meeting in Detroit, Feb. 24, at which Mr. Green will speak, climaxing a speaking tour of automotive centers he is planning. At the Detroit mass meeting the proceedings will be broadcast over a nation-wide radio hook-up through the facilities of the National Broadcasting Company. The radio will pick up the meeting at 8.30 p.m. and continue broadcasting until 9 p.m., according to the NBC.

A. R. Demory

A. R. Demory, one of the organizers of the Timken-Detroit Axle Co., died February 10 in Santa Barbara, Cal. At the time of his death, he was in the real estate business.

Thomas H. Corpe
New director of advertising and sales promotion for Buick

Eastman Regulatory Bills Found Wanting by Truckers

Members of the policy committee of the American Trucking Associations, Inc., meeting in Washington last week, found the Eastman motor carrier bill, H. R. 5262, wanting in many respects. They appraised it substantially more liberal than previous bills of a similar nature, but still not acceptable without numerous amendments. The committee did agree that some degree of federal regulation in addition to the code was desirable.

Three of the outstanding criticisms of the proposed regulatory act were:

1. The absence of any adequate policing agency to enforce its provisions.
2. Failure to take into consideration the gains made in regulation of the industry under its code of fair competition.
3. The failure to include the code machinery in the administration of the act.

It is doubtful whether the Eastman bill in its present form would have been endorsed had the matter been brought to a vote. If such a vote had been taken it is probable that the industry would have demanded the acceptance of numerous amendments and the assurance of the passage of the complementary bill drafted by Mr. Eastman providing for the reorganization of the Interstate Commerce Commission and the administration of the Motor Carrier Act by a special division of that commission.

The committee favors a degree of regulation for the shipper operator, the forwarding and car loading companies and the lessees of trucks. Some of the cartage representatives on the committee indicated their desire not to be under federal regulation to which the Eastman bill would subject them under certain conditions.

More Confidence in Jobs Reflected by Increase in Ratio of Time Sales

Retail financing of new cars increased 39 per cent in units and 49 per cent in dollars in 1934, as compared with the previous year. The number of used units financed rose 30 per cent, while the dollar volume of such business gained 34 per cent. Wholesale financing increased 86 per cent.

The gain in retail new car financing was larger than the improvement in retail sales with the result that the ratio of new cars financed to new cars sold, rose from 49 per cent in 1933 to 54 per cent in 1934. The improvement in this ratio is an indication that buyers have greater confidence in the continuity of their incomes and hence are more willing to commit themselves on installment purchases of automobiles.

The marked increased in wholesale financing shows that in 1934 dealers leaned on the finance companies for inventory credit accommodation more than ever before in history. Per new car sold, wholesale financing amounted to $471 last year as compared with $321 in 1933.

The detailed figures as compiled for 282 identical finance companies by the Census Bureau are presented in the following table:

	1934	1933
Wholesale financing	$890,238,562	$479,984,028
Retail financing:		
Number of cars—new and used	2,283,587	1,711,130
Volume " " "	853,431,268	596,453,758
Per car " " "	374	349
Number of new cars	1,014,664	728,571
Volume on new cars	559,167,458	375,712,921
Per new car	551	516
Number of used cars	1,221,917	943,473
Volume on used cars	277,726,191	208,359,170
Per used car	227	221

Retail financing unclassified as between new and used cars is included in the total retail figures.

Wolman Hits Critics Who Expect Collective Bargaining Miracles

Dr. Leo Wolman, chairman of the Automobile Labor Board, struck back at critics of that agency in a signed article in last Sunday New York *Times*, declaring that those who looked for collective bargaining miracles, were doomed to disappointment.

"The difficulties which many talk about," he said, "and which still constitute the root of the problem of collective bargaining, are, in the experience of this board, not so much the absence of collective bargaining as in the inexperience of many of the representatives of both industry and labor who have undertaken in this past year to bargain collectively and the desire of one organized group or another to obtain for itself a monopoly of the privilege of bargaining for the employees.

"For this problem there is no easy solution. The development of collective bargaining must needs be a slow and patient process in which all concerned are the more successful the greater their experience and skill. Those who look for miracles in industrial relations are doomed to disappointment, no matter how stringent the terms of the law or administrative order to which they may turn for support."

It is interesting to note that the President expressed much the same thought in the statement he issued Monday following his meeting with the A. F. of L. council. He said: "My impression is that our difficulties are found largely in the heretofore unorganized field, both as it affects employers and employees. In such cases we must have patience."

Continuing Dr. Wolman said: "In an industry in which there are many organized groups competing for position, and a strong tendency on the part of each to look with suspicion upon its competitors, the correct method for setting up a fair and workable system of representation consists in affording all of the workers in the industry a free and secret method of choosing their representatives. Accordingly, the Automobile Labor Board, when it made its plans for setting up representation within the industry, was determined to hold elections which, as to procedure and as to form of ballot, would be as free from criticism as possible. It therefore organized its own election machinery under the direction of Francis E. Ross, Professor of Accounting at the University of Michigan, who was instructed by the board to engage a force of men free from all possible entangling alliances.

"Every step in both the primary and final elections now being conducted in the industry is completely under the control of the board.

"Now that the election machinery of the board has been perfected and the election officials have acquired the necessary experience, it is the purpose of the board to schedule elections in the remainder of the industry as rapidly as possible.

"Meanwhile the board has before it the task of organizing the new machinery of industrial relations. During the past weeks it has held conferences with the elected members of the various bargaining committees and has discussed with them the scope of their operations, the procedure they had best pursue, the relation of the representatives to their constituents, the issues on which they are entitled to appeal to the board, and many similar questions. Before long the board will be prepared to issue the formal rules governing the conduct of representatives and bargaining committees in their relation to the management and to the working men whom they represent."

Japan Ready to Enter Western Motor Markets

Brazil and Netherlands Arrange for Distribution of Low-Priced Automobile

That the Japanese automobile industry has reached a point where it may be in a position to compete in foreign markets is indicated in reports received in the Commerce Department from its representative abroad.

In Brazil, according to advices from the Assistant Commercial Attache at Rio de Janeiro, local automotive trade circles report that a Brazilian importer has just concluded arrangements for the distribution of a light Japanese automobile, several units of which will be brought into the country within the next four months. While details in connection with the car are not available, its main appeal is expected to be small gasoline consumption and its extremely low price of approximately $285, the report states.

A Dutch firm is said to have contracted for the importation of approximately 400 Japanese cars, according to a report from the Commercial Attache at The Hague, and the shipment is reported to be already en route. It is rumored, the report states, that the prices of these Japanese cars will be approximately 40 per cent under those of small British makes.

Dillon Urges AFL Support, Sees Inevitable Contest

Every officer and member of AFL automotive unions, is urged to be ready for "the inevitable contest" at the conclusion of President Green's tour of the industry which will wind up in Detroit, February 23, in a statement issued last week by F. J. Dillon, AFL general organizer.

"To the automobile worker comes the duty and responsibility," the statement concluded, "of participating in the greatest industrial drama that has ever been enacted in our country and we need now their confidence, loyalty and devotion and I shall depend upon the cooperation and support of every member everywhere."

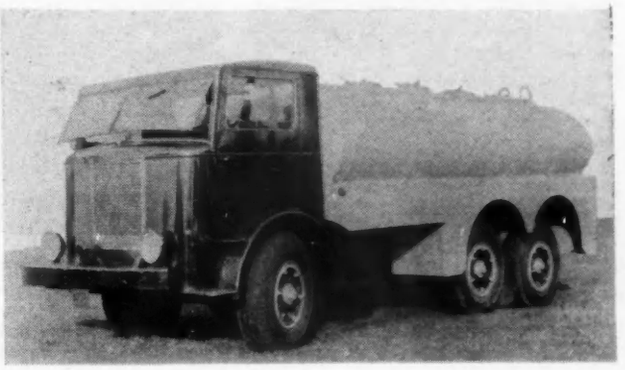
In the statement, which is intemperate and bitterly critical throughout, Mr. Dillon charges Donald Richberg and Dr. Leo Wolman with deliberate misrepresentation and refers to Richard L. Byrd, labor member of the ALB, as "the modern Judas who betrayed them (the workers) in their hour of distress and suffering."

Auburn Elects Ames

Harold T. Ames has been elected executive vice-president of the Auburn Automobile Co., according to an announcement by R. H. Faulkner, president, at the annual meeting of the stockholders.

Mr. Ames also was made a director of the company succeeding W. H. Beal, who recently became vice-president of the Cord Corporation.

Other officers and directors were re-elected.



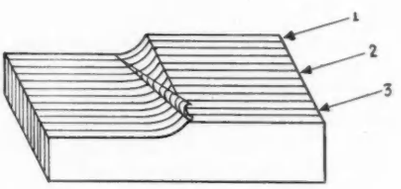
New cab-over-engine three-axle job produced by FWD. It is rated at 40,000 lbs. gross.

Micro-Movie Study Shows What Happens

ONE of the most brilliant demonstrations of what happens when metal is cut resulted from fundamental studies made in the research laboratories of the Cincinnati Milling Machine Co., and reported by Hans Ernst and M. Martellotti, both of that organization, in a paper, "Metal Cutting: the Formation and Function of the 'Built-Up' Edge," which was read at the 1934 annual meeting of the A.S.M.E.

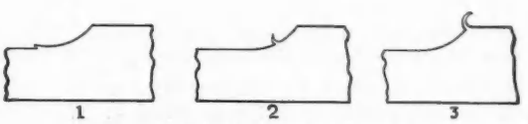
Mention of this paper was made in *Automotive Industries* in connection with a report of the meeting and it is our intention here to give some additional highlights which may be of interest to our readers.

According to Mr. Ernst the practical importance of a study of the formation of the built-up edge arises from the fact that its existence and magnitude greatly influence, first, the quality of surface produced on the work, and second, the mode of wear of the cutting tool. Accordingly, if we can obtain a clear understanding of its formation, we will be better able to modify the design of the cutting tool, or the conditions of the cut, so as to obtain its advantages, or obviate its disadvantages, as the case may require.



Laminated block with partially formed chip

Fig. 3—Form of laminated block used to study chip formation on milling machine. Laminations are separated after stopping the cutter and permit a detailed study of the progressive change in structure of the chip.



Laminations separated to show progressive change of structure during chip formation.

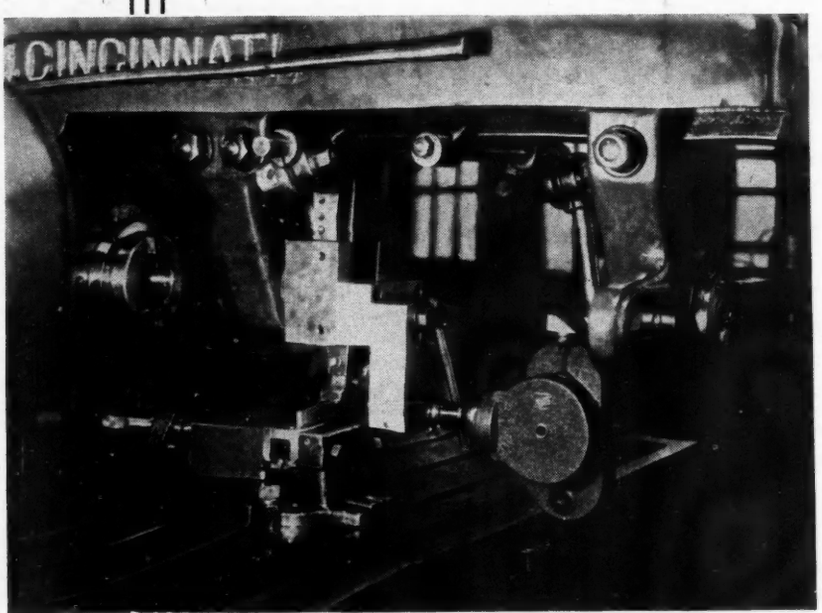


Fig. 2—Milling machine set-up in metal cutting investigation at Cincinnati Milling. Microscope is focused upon area at cutting edge and camera is focused through microscope eyepiece.

Fig. 1 is a typical example of a well defined built-up edge. The machine used in this case was a lathe, and the cut was permitted to continue freely for some time before being suddenly stopped. Even a casual examination of this picture will show the two principal features of a cut of this type, namely: that in the main body of the chip, the elongation of the crystalline grains (or the flow) is in a direction approximately perpendicular to the face of the tool; while in the built-up edge it is roughly parallel thereto. It is this parallel—or lateral flow-structure in the built-up edge that has given rise to the various "aggregation theories" of its formation.

The authors then show by means of motion pictures the behavior of materials of relatively low tensile strength which produce a "shear type" chip. As will be shown subse-

# of Built-Up Edge When Metal Is Cut

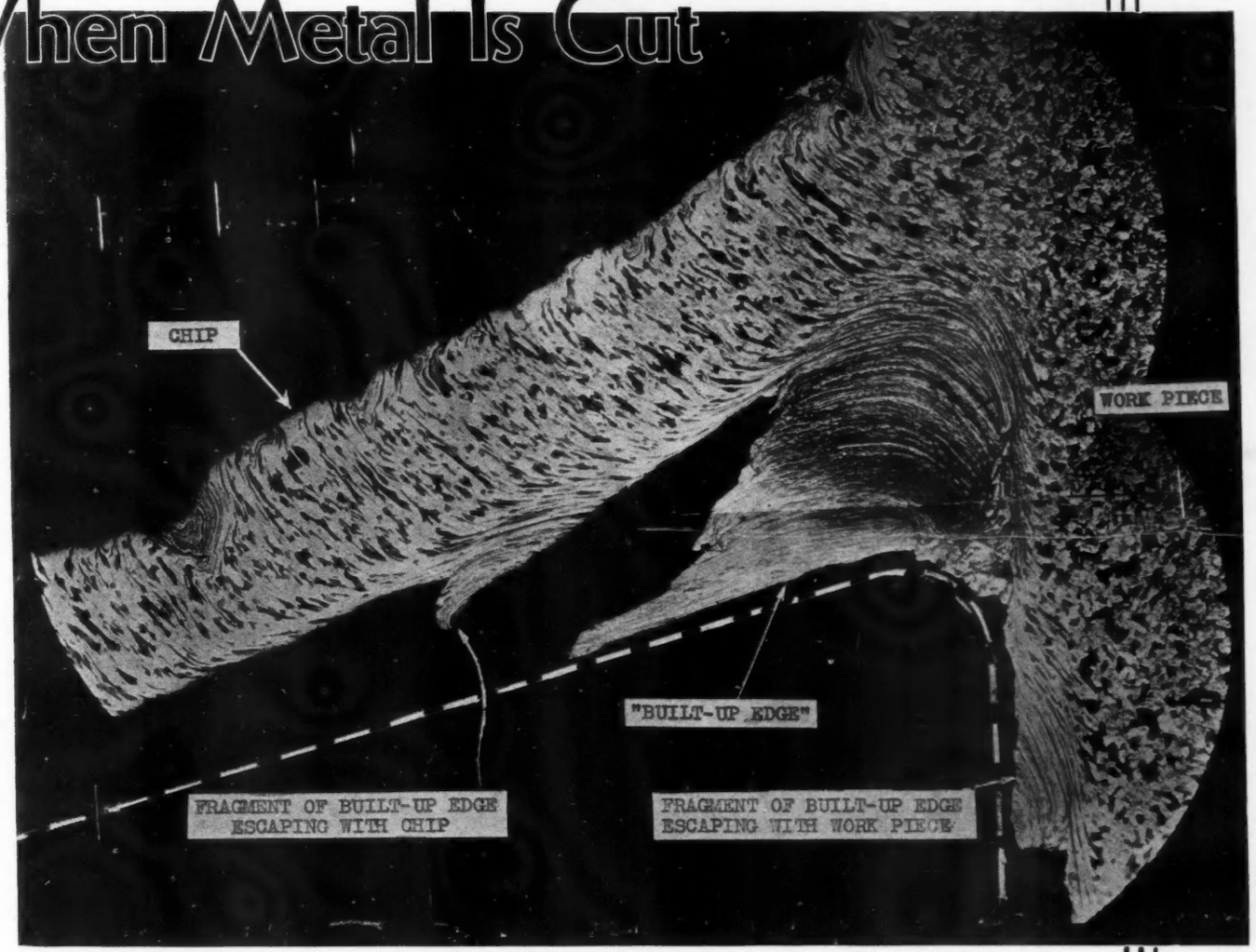

CHIP
WORK PIECE
"BUILT-UP EDGE"
FRAGMENT OF BUILT-UP EDGE ESCAPING WITH CHIP
FRAGMENT OF BUILT-UP EDGE ESCAPING WITH WORK PIECE

Fig. 1—New experimental work develops mechanism of chip formation and the built-up edge over the nose of the cutting tool shown by the dashed line.

quently, all studies on the special set-up in the milling machine, Fig. 2, were made by focusing a microscope on the area at the tool tip, and then focusing a motion picture camera through the microscope eyepiece.

The existence and extent of the built-up edge in turning operations has been studied in the past, with various depths of cut and front rake angle, by suddenly stopping the lathe and removing a section of the chip and neighboring work material for microscopic examination. One of the limitations of this method has been that the built-up edge was already fully formed, and thus no information could be obtained as to the processes involved in its formation.

To study in detail the development of the built-up edge from the instant that the cutting tool first penetrates the work to the time that the chip is completely formed, the authors modified this method to the extent of using a milling machine and spiral milling cutter instead of a lathe. A laminated work piece, (with the laminations parallel to the plane of rotation of the cutter) was used for this investigation. As shown in Fig. 3 the use of the laminated block and spiral milling cutter makes it possible to study the structure of the chip and built-up edge at any stage of development.

The following conclusions are drawn by the authors on the basis of the preliminary investigations: "It has been definitely shown that the built-up edge is not an accumulation of particles of material gathered by the tool as it passes over the work, but on the contrary is composed of the same material as the chip, and its formation begins immediately the tool contacts with the work; in many cases, however, it may not be carried to completion in the form in which we are accustomed to see it. This is well exemplified in the segmental chip formation char-

(Turn to page 214, please)

Bluebird Rebuilt for N

Features

More completely streamlined with air for cooling radiator taken in through slot in the nose which can be closed during timed mile to reduce resistance.

* * *

Pneumatic brakes, in addition to the regular wheel brakes, are provided in the form of flaps just aft of the rear wheels which may be raised by vacuum cylinders and which increase both resistance and traction.

* * *

Power-plant is a 12-cylinder supercharged Rolls-Royce developing 2500 hp.

* * *

Each rear axle shaft driven by separate pair of bevel gears. Axle shafts are offset to give necessary clearance.

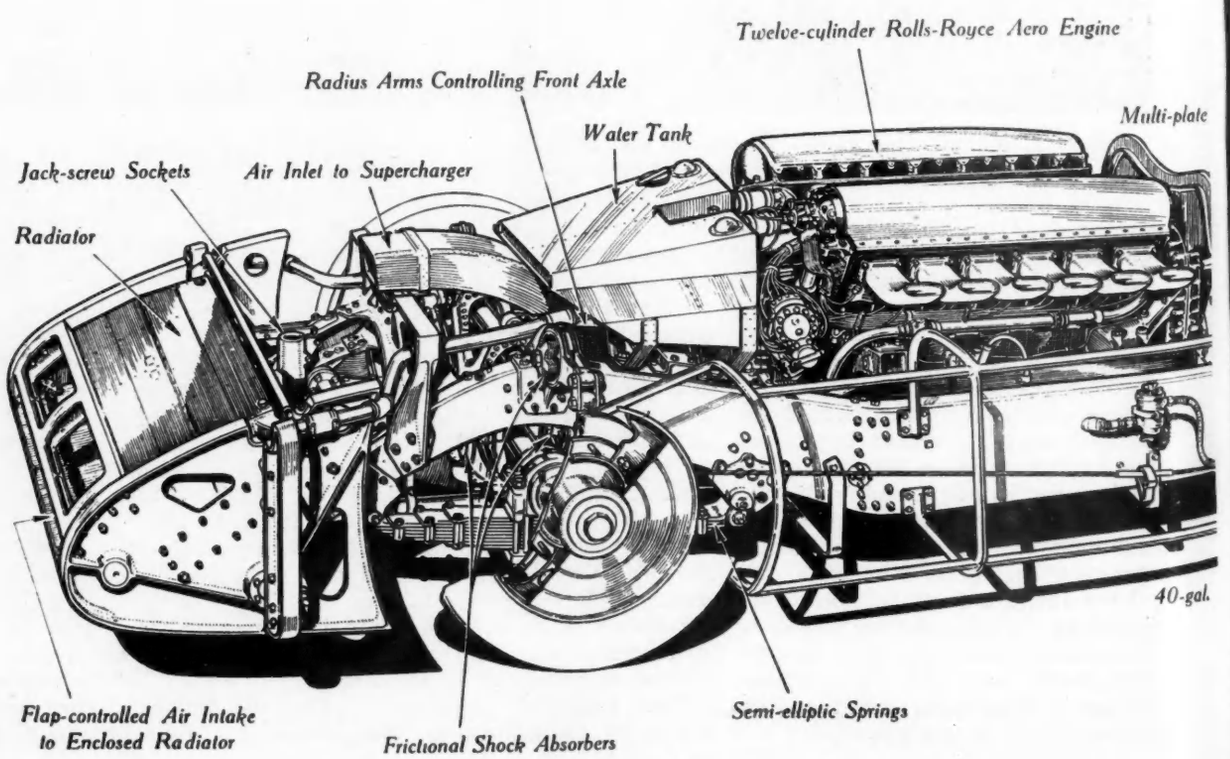
* * *

Dual tires used at the rear.

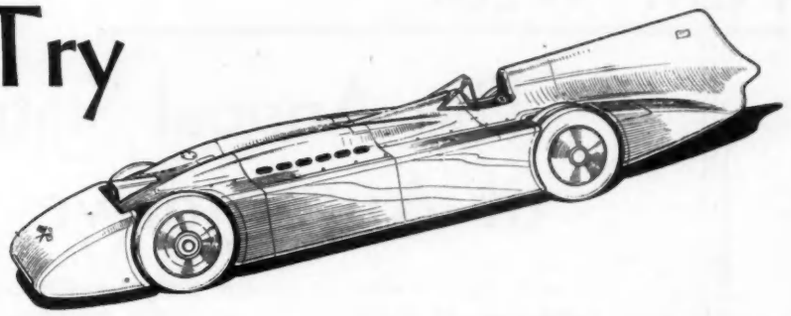
THREE-HUNDRED miles per hour is the speed aimed at by Sir Malcolm Campbell, who has come to this country with a new edition of the Bluebird with which he will attack his own world's record on the beach at Daytona, Fla., shortly. Excellent descriptions and illustrations of the new racer have appeared in recent editions of our British contemporaries, the drawings reproduced herewith being from *The Motor*.

The Bluebird is again powered by a twelve-cylinder supercharged Rolls-Royce engine of 6 in. bore and 6⅝ in. stroke, which gives a piston displacement of 2230 in. The engine is said to develop 2500 hp.; it is 91½ in. long and weighs 1630 lb. Power is transmitted through a multiple-disk clutch and a three-speed and reverse transmission without direct drive, the drive being from a driving to a parallel driven shaft for each forward speed. An enclosed propeller shaft carries the power to the rear axle, where there is a separate bevel-gear transmission for each of the two axle-shafts. The driving shaft carries two bevel gears facing each other, each of which meshes with a bevel gear on an axle shaft. But in order to avoid interference between the two pairs of bevel gears, instead of being in line with each other as in conventional designs, the two axle shafts are slightly offset in the horizontal plane (1½ in.). The rear-axle ratio is 1.19 to 1 and at the hoped-for speed of 300 m.p.h. the engine would run theoretically at 3200 r.p.m.

The wheelbase is 164 in. and the track about 60 in. while the overall dimensions are 339 by 83 in. Ready for the track, with lead ballast, the racer weighs approximately 5 long tons. The Bluebird was designed by Reid A. Railton and was built by Thompson & Taylor at Brooklands, England.



New Record Try

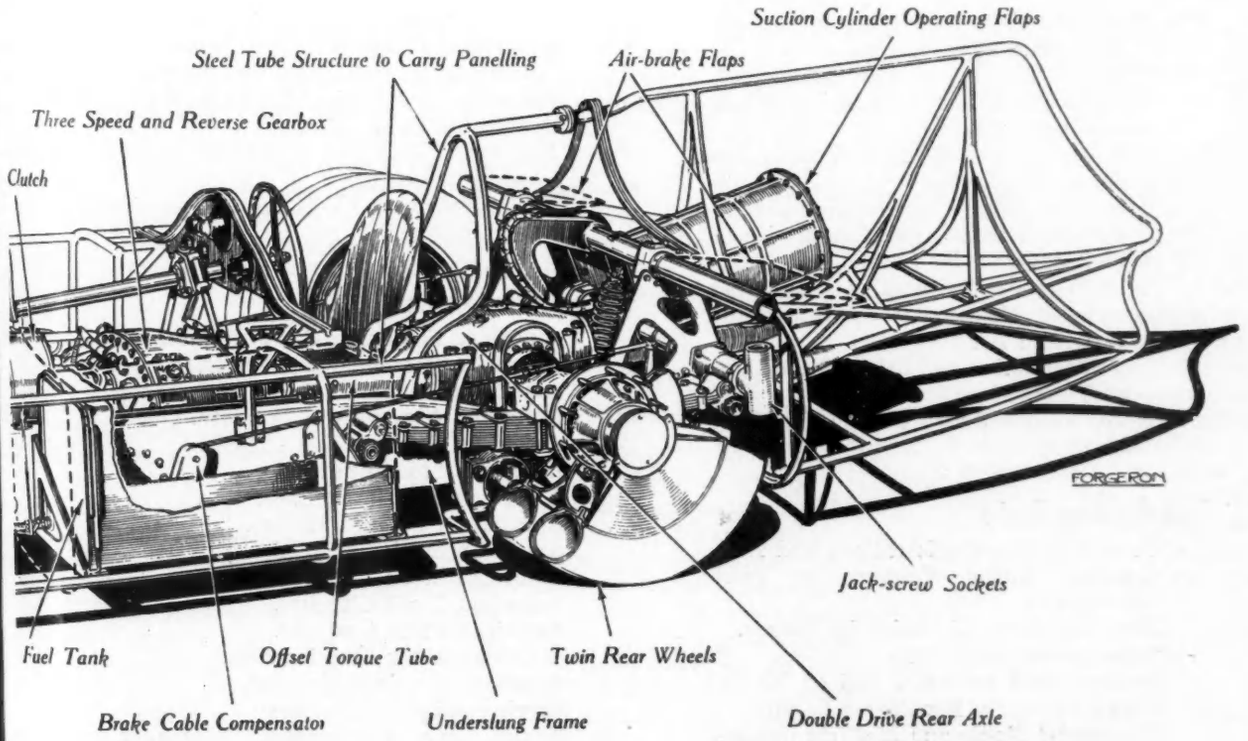


Most striking among the changes made in the Bluebird since it established a world's record of 272.46 m.p.h. are those in the form of the nose and of the sheet-metal work generally. The nose has a slot extending its full width, through which the air for the radiator enters. This slot can be closed by means of a balanced flap controlled from the driver's seat, and it is planned to close the slot and thus cut down the air resistance slightly just as the car approaches the measured mile.

The main part of the body has been extended in width so that both front and rear wheels (the latter now dual) run in recesses formed in the sheet-metal fairing, which latter is supported by a rigid framework of steel tubing. The hood over the engine fits as closely as possible and the bulges seen in it actually are the valve covers of the engine.

In addition to the regular wheel brakes, pneumatic brakes are provided, in the form of two flaps just back of the rear wheels which fit snugly into the sheet-metal fairing when not in use. When the brake pedal is depressed, these flaps are raised into an inclined position by means of vacuum cylinders, and then not only add to the car's resistance to forward motion through the air, but press the rear wheels harder to the ground, so that the mechanical brakes can be made more effective.

In order to place the driver as low as possible, the propeller shaft is offset from the center of the car and the driver's seat is between it and one of the side rails. The dual steering gear used formerly has been discarded and the steering layout now corresponds to that of a conventional car. The front axle design has been changed, the axle now being free in bearings secured to the front semi-elliptic springs, so that the springs will not be subjected to braking torque. Torque reaction is taken on a frame cross member, to which connection is made by a mechanism which provides for the up and down motion of the axle relative to the frame. Steering stabilizers are fitted to the front axle, to prevent wheel wobble. The frame is underslung at the rear and rubber bumpers are provided to limit its motion relative to the axle. All springs are semi-elliptic. No fewer than ten friction-type shock absorbers are fitted, four at the rear and six in front. Detachable undershields extend the full length of the chassis.



NEXT WEEK

The Annual Statistical Issue of Automotive Industries

An invaluable reference book of the automotive industry containing information of practical and continuing use to general managers, engineers, production men and sales executives. Among other important new features, this year's issue will contain for the first time the annual analysis of the Chilton Trade List showing the number of dealers by makes, by population groups and by states. The following table of contents shows the scope of the information that will be presented:

Registrations

World Registrations of Motor Vehicles by Continents.
Registration Fees and Gasoline Taxes by States.
U. S. Motor Vehicle Registrations by Years.
U. S. Motor Vehicle Registrations by States.
World Registrations of Motor Vehicles by Countries.

Production

World Car and Truck Production by Countries.
European Production Totals.
Canadian Production by Years.
Passenger Car Production by Body Types.
Passenger Car Production by Leading Manufacturing Groups.
Truck Production by Capacities.
Passenger Car Production by Wholesale Price Classes.
Wholesale Value of Motor Vehicle Production by Years.
Ten Year Record of Automotive Production, Payrolls and Employment.
Tire Production by Types.
U. S. Airplane and Engine Production.
Scheduled Transport Operations of American Air Lines.
U. S. Production and Sales of Airplanes by Types.
Motor Vehicle Production by Years and Months.

Marketing Data

U. S. New Car Registrations and Estimated Dollar Volume by Price Classes.
New Car Domestic Sales by Makes.
Sales Outlets by States.
Dealer Count by States and by Makes.
Dealer Count by Population Groups.
Number of Single and Multiple Dealers by Makes.
Passenger Car Representatives by Makes.
New Motor Vehicle Sales by Dealer.
Sales of Aircraft Parts.
Average Wholesale Price of Cars and Trucks.
New and Used Car Financing Data.
Trends in Car Use, Junking, Average Age and Age Destruction.
New Car Registrations by Years and by Months.
New Passenger Car Registrations by States.
New Truck Registrations by Makes.

Exports

Foreign Sales of Motor Vehicles by Years.
Leading Automotive Export Markets with Units and Value.
Imports of Motor Vehicles into U. S.
Airport Exports and Their Value.
American Passenger Car Exports by Continents with Units and Value.
American Truck Exports by Continents with Units and Value.
Ratio of U. S. Foreign Sales to American Production.
U. S. Exports of Parts and Accessories by Continents.

Specifications

American Passenger Car Power Plants.
American Passenger Car Chassis.
American Trucks.
American Agricultural Tractors.
American Gasoline Bus Chassis.
American Stock Engines.
American Marine Engines.
American Outboard Motors.
American Stock Rear Axles.
American Stock Front Axles.
American Stock Clutches.
American Stock Gearsets.
American Stock Steering Gears.
American Airplane Engines.
Foreign Airplane Engines.
British and Continental Passenger Cars.
American and Continental Diesel and Other Heavy Oil Engines.

JUST AMONG OURSELVES

Ammunition for Labor Leaders

NRA'S preliminary report on automotive employment and working conditions which was summarized very briefly in last week's issue, is immediately important chiefly for the adverse publicity it brought the industry and for the use that labor leaders will make of its conclusions.

Obviously it had little influence on the renewal of the automobile manufacturing code since the President ignored all of its recommendations except the fall announcement plan which was first suggested by the manufacturers themselves as a promising regularization possibility as far back as November, 1933.

So far as labor is concerned, the report demonstrates primarily that a depression of the proportions of the one we are passing through is hell on industrial workers — particularly workers engaged in the production of durable goods such as automobiles. The fundamental long-swing question it raises is whether this industry—and for that matter all industry—is doing as much as it reasonably could, should or might do for its workers under prevailing conditions. The report leaves few doubts as to how its authors feel on this question.

They point out that "the report must in the aggregate paint a rather dark picture, inasmuch as the study was caused to be made in the search for improvement of conditions to which evidently insufficient attention had been directed in the past." As a result the picture presented is not well proportioned in many respects and was further distorted in some newspaper accounts which seized on the sensation in the opinions expressed on automotive working conditions and used the report's conclusions to fan the flames of controversy over the renewal of the code.

In its consideration of the regularization problem, the report is notably objective and its discussion of this question is infinitely more rational than anything that has come from any governmental source previously. Unfortunately this detached attitude was not maintained entirely in the portion of the report summarizing and appraising the testimony on working conditions.

"Labor unrest," the report declares, "exists to a degree higher than warranted by the depression. The unrest flows from insecurity, low annual earnings, inequitable hiring and rehiring, espionage, speed-up, and displacement of workers at an extremely early age."

* * *

Skeletons in the Automotive Closet

IT would be silly to deny that labor unrest exists. In view of the hardships labor has suffered during the depression, it would be a miracle and a sad commentary on the American spirit if unrest were not widespread. It would be equally silly to insist that there are no skeletons in the automotive closet. In an industry as large as this with thousands of executives, foremen, etc., there are bound to be some tyrants.

Undoubtedly instances — in some cases perhaps many instances—can be found proving the existence of all the reprehensible practices of which the industry is found guilty. But, if the testimony at the Detroit hearing was typical of that offered at subsequent private conferences in other automotive centers, it fell far short of proving that the practices referred to are the general rule, nor did it justify the positiveness with which the report expresses its conclusions on these points.

Since the report runs to nearly 90 typewritten pages and is accompanied by even more voluminous appendices, it is obviously impossible to discuss it in detail. The whole report is well worth reading, however, and it is to be hoped that it will be made available for general distribution in the industry. Whether or not the industry generally deserves the criticism that is directed at it, this picture of ourselves as some others see us merits not only careful study, but also should lead to corrective action where such action is necessary.

* * *

Hours and Costs

MANY eyes are watching developments in the automotive code situation, particularly the probable reaction to the Henderson report. We learn that an important company in the automotive industry has circularized all its parts producers to learn what the effect of code changes might be upon their business. This questionnaire goes deeply into the financial structure of the company, possibility of expansion, trend of production costs, etc. Incidentally, one of the students of this problem tells us that in his opinion, a compulsory 40-hr. week might increase parts costs by 20 per cent.

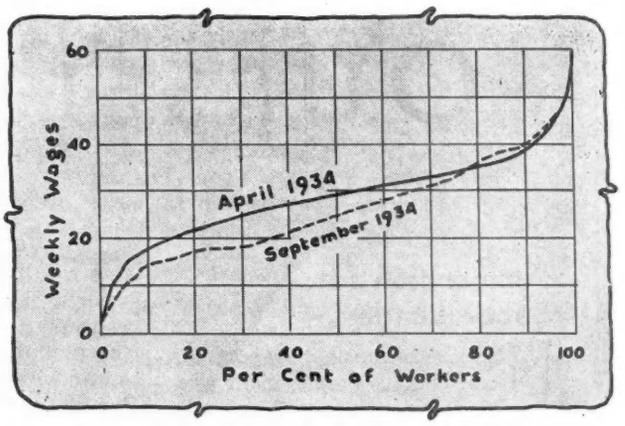
The Editors

Data from the NRA Report o

Per Cent of Total Man-Hours in Each Calendar Year Worked in Each Month, January, 1929-November, 1934, Companies Reporting Under the Automobile Code Which Also Supplied Pre-Code Data

	1929	1930	1931	1932	1933	1934[1]
January	9.45	9.73	7.93	10.82	9.15	7.73
February	9.83	9.98	8.81	10.21	7.34	9.30
March	10.62	10.64	10.45	10.08	5.25	11.93
April	10.35	10.95	11.47	9.47	7.95	12.07
May	10.08	11.02	11.10	10.57	9.61	9.97
June	9.10	9.59	9.09	10.62	10.92	9.27
July	8.49	6.62	7.94	8.46	10.61	8.34
August	8.80	7.19	6.73	5.18	10.54	7.09
September	7.53	6.71	6.29	5.07	8.55	5.97
October	7.08	6.31	5.52	4.96	6.32	5.37
November	4.40	5.74	6.27	6.14	5.65	5.44
December	4.27	5.52	8.40	8.42	8.11	...

[1] No figures available for December, 1934. For the purpose of obtaining an estimate of total man-hours in 1934, man-hours in December have been increased over those in November, 1934, by the average per cent increase of December man-hours over November man-hours in the three preceding years.



The April curve is based on the earnings of 4712 male employees during one week in that month. Average earnings for the group were $28.50, with about 50 per cent earning more and 50 per cent less.

The September curve is based on the earnings of 3155 male employees in one week in that month. The average for the group was $26.01.

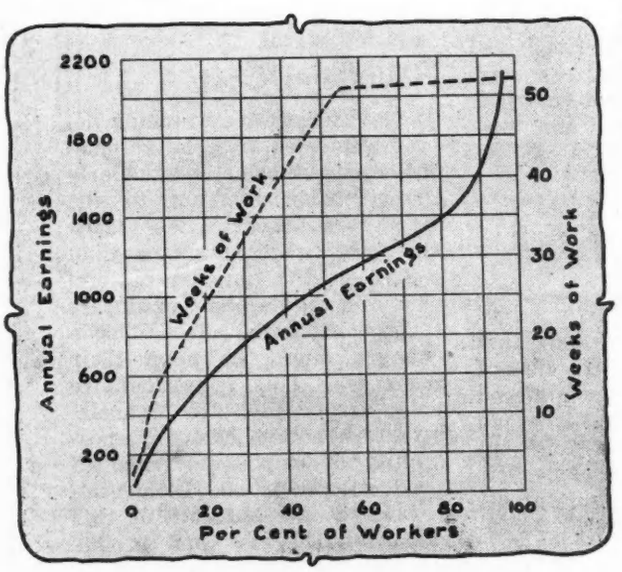


Chart based on the analysis of the records of 8614 employees in four representative plants. About 60 per cent worked 40 or more weeks, while about 45 per cent earned $1,000 or more in 1934. Due to form in which basic data is presented in Exhibit 28, the earnings curve may average $50 high.

Weekly Hours of Designing Engineers

MAXIMUM HOURS WORKED IN ANY ONE WEEK
DISTRIBUTIONS OF EMPLOYEES BY MAXIMUM HOURS PER WEEK

Maximum Hours per Week	Number of Employees 1929	1932	1933	1934
Less than 35	0	1	0	3
35-39	0	0	1	12
40-44	28	20	32	61
45-49	19	22	50	42
50-54	24	16	18	10
55-59	13	15	20	9
60-64	20	36	21	2
65-69	16	20	4	1
70-74	19	24	5	1
75-79	14	6	2	1
80-84	16	9	2	0
85-89	6	2	2	1
90 & over	11	2	2	0
Total	186	173	159	143

NOTE: See notes under Table IIA.

Data supplied by Society of Designing Engineers. Presumably these and other similar data influenced NRA considerably in its recommendation that the exemption from hour limits which the code grants employees earning more than $35 weekly be applied only to executives.

on the Automotive Industry

CUMULATIVE PERCENTAGE DISTRIBUTION OF THE ANNUAL EARNINGS OF 8614 WORKERS WITH THE COMPANIES EMPLOYING THEM IN A PEAK MONTH OF 1934

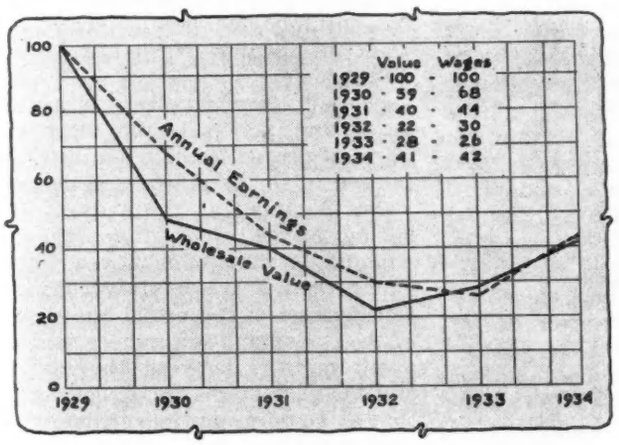
Paid by Company During 1934	Plant "A," Per Cent	Plant "B," Per Cent	Plant "C," Per Cent	Plant "D," Per Cent	Four Plants, Per Cent
Under $400	0.2	7.7	7.7	31.7	11.4
Under 800	5.6	28.1	37.0	60.3	21.9
Under 1,200	47.4	70.9	69.4	76.9	64.8
Under 1,600	86.5	91.2	93.8	95.3	89.4
Under 2,000	95.5	97.4	98.0	98.3	97.0

This table shows that annual earnings vary widely from plant to plant, indicating that some producers have been much more successful in giving continuity of employment than others.

Data on Hours Actually Worked by Male Employees in Four Representative Plants

	A Week in April, 1934	A Week in Sept., 1934
Number of employees	9,525	6,286
Average weekly hours	36.2	33.4
Total man-hours worked	334,000	210,000
Number of employees working more than 40 hours	635	177
Number of hours worked in excess of 40	283	270
Per cent of employees working over 40 hours	6.9	2.8
Per cent hours worked in excess of 40 to total man-hours	0.08	0.13

Adapted from Exhibit 20a.



The annual earnings curve is adapted from data supplied by the MESA, Exhibit 17, 1929 = 100 = $2433. The other curve represents the wholesale value of motor vehicle production.

Earnings of Designing Engineers

ANNUAL EARNINGS
DISTRIBUTIONS OF EMPLOYEES BY DOLLARS EARNINGS PER YEAR

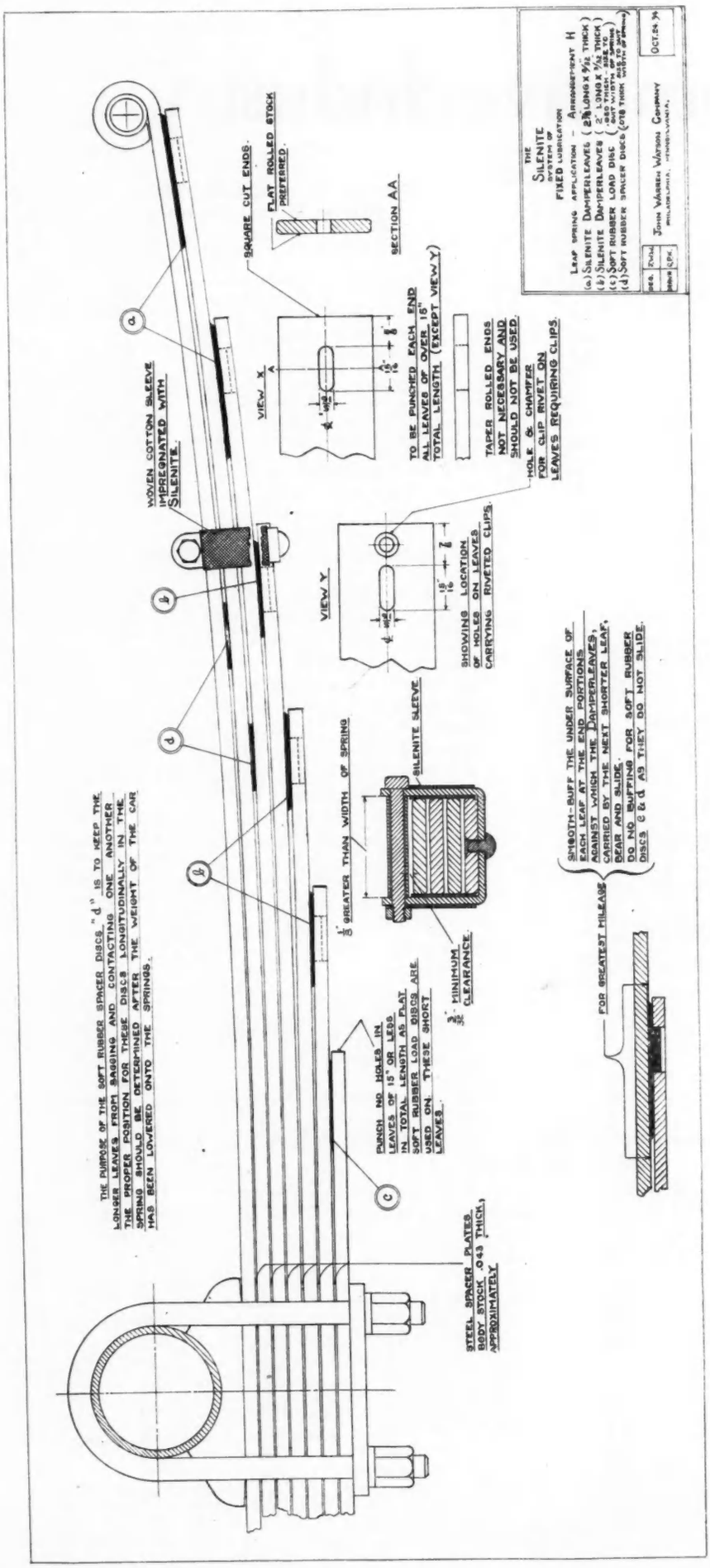
Dollars per Year	Dollars per Week*	Number of Employees 1929	1932	1933	1934
Less than 260	Less than 5	0	2	10	2
260- 519	5- 9	0	12	23	10
520- 779	10-14	0	9	34	7
780-1039	15-19	0	19	38	7
1040-1559	20-29	2	41	27	42
1560-2079	30-39	14	30	12	34
2080-2599	40-49	30	22	7	35
2600-3119	50-59	53	17	5	6
3120-3639	60-69	39	6	3	0
3640-4159	70-79	25	4	0	0
4160-4679	80-89	17	0	0	0
4680 & over	90 & over	6	2	0	0
	Total	186	164	159	143

*Annual earnings divided by 52.
NOTE: See notes under Table IIA.

Data supplied by Society of Designing Engineers.

Predicted Effects of Fall Announcement Plan on Sales, Stocks, Inventories, Production and Employment.

	Retail Sales Old Model	Retail Sales New Model	Stocks End of Month Old	Stocks End of Month New	Production New	Percentage of Total Employment	Efficiency of Force	Hours Worked Per Week
October	..	..	3.0	6.0	6.0	60	80	40
November	3.0	5.5	..	7.7	7.2	100	80	40
December	..	6.6	..	9.2	8.1	100	90	40
January	..	5.5	..	11.8	8.1	100	100	36
February	..	5.9	..	14.9	9.0	100	100	40
March	..	9.4	..	14.5	9.0	100	100	40
April	..	12.3	..	13.0	10.8	100	100	48
May	..	12.0	..	11.8	10.8	100	100	48
June	..	10.3	..	10.5	9.0	100	100	40
July	..	9.1	..	9.6	8.2	100	100	36
August	..	8.5	..	9.3	8.2	100	100	36
September	..	6.9	..	8.0	5.6	100	100	26
October	..	5.0	..	3.0				
November	..	3.0						


THE SILENITE SYSTEM OF FIXED LUBRICATION
LEAF SPRING APPLICATION — ARRANGEMENT H
(a) SILENITE DAMPERLEAVES (2½" LONG X 9/32" THICK)
(b) SILENITE DAMPERLEAVES (2" LONG X 9/32" THICK)
(c) SOFT RUBBER LOAD DISC (.687 WIDTH OF SPRING)
(d) SOFT RUBBER SPACER DISCS (.078 THICK .687 WIDTH OF SPRING)
JOHN WARREN WATSON COMPANY
PHILADELPHIA, PENNSYLVANIA.
OCT. 24 '34
SECTION AA
SQUARE CUT ENDS.
FLAT ROLLED STOCK PREFERRED.
VIEW X
TO BE PUNCHED EACH END ALL LEAVES OF OVER 16" TOTAL LENGTH (EXCEPT VIEW Y)
TAPER ROLLED ENDS NOT NECESSARY AND SHOULD NOT BE USED.
HOLE & CHAMFER FOR CLIP RIVET ON LEAVES REQUIRING CLIPS.
WOVEN COTTON SLEEVE IMPREGNATED WITH SILENITE.
VIEW Y
SHOWING LOCATION OF HOLES ON LEAVES CARRYING RIVETED CLIPS
SILENITE SLEEVE
1/8" GREATER THAN WIDTH OF SPRING
3/32" MINIMUM CLEARANCE
SMOOTH-BUFF THE UNDER SURFACE OF EACH LEAF AT THE END PORTIONS AGAINST WHICH THE DAMPERLEAVES, CARRIED BY THE NEXT SHORTER LEAF, BEAR AND SLIDE. FOR SOFT RUBBER DO NO BUFFING DISCS c & d AS THEY DO NOT SLIDE.
FOR GREATEST MILEAGE
PUNCH NO HOLES IN LEAVES OF 15" OR LESS IN TOTAL LENGTH AS FLAT SOFT RUBBER LOAD DISCS ARE USED ON THESE SHORT LEAVES.
THE PURPOSE OF THE SOFT RUBBER SPACER DISCS "d" IS TO KEEP THE LONGER LEAVES FROM SAGGING AND CONTACTING ONE ANOTHER THE PROPER POSITION FOR THESE DISCS LONGITUDINALLY IN THE SPRING SHOULD BE DETERMINED AFTER THE WEIGHT OF THE CAR HAS BEEN LOWERED ONTO THE SPRINGS.
STEEL SPACER PLATES. BODY STOCK .043 THICK, APPROXIMATELY
a
b
c
d

Quiet, Aim of

A METHOD of stabilizing leaf spring action which is asserted to give and maintain uniform inter-leaf friction and freedom from squeaks over long periods of time and with practically no service attention, has been developed by the John Warren Watson Company. It is known as the Silenite System of Fixed Lubrication, and already has been adopted as standard equipment on all 1935 Nash and Lafayette models.

The effects which the system has on spring action result from the physical properties of Silenite which is used in the form of small damper leaves mounted at the ends of the spring leaves where they take all rubbing as the spring flexes. These Damperleaves are used in conjunction with steel spacers at the center of the spring and soft rubber spacers about midway between the centers and the ends of the spring leaves, so that at no point do the spring leaves contact with each other.

Silenite is a material of peculiar frictional properties. It is a well-known and long-established rule of mechanics that the friction of rest is greater than the friction of motion. This does not seem to hold for Silenite in rubbing contact with steel, for if there is any difference at all between the friction of rest and the friction of motion between these two materials it is so exceedingly small that it cannot be detected. This can be demonstrated strikingly by placing one of the Silenite Damperleaves on a bar of steel with smoothly finished surface and then raising one end of the bar. The Damperleaf begins to slide on the bar almost immediately the bar is raised, that is, for a very small angle of inclination. Of course, the sliding motion is very slow, which is due to the fact that the force causing this motion—the component of the weight of the Damperleaf in the direction of sliding motion—is very small. As the

Uniform Spring Action—The New Silenite Damperleaves

inclination of the bar is increased the speed of motion increases hardly perceptibly. This is in strong contrast to the frictional action of most ordinary materials, which would stay in position on the bar up to a considerable inclination, and then, after "breaking loose," slide down the bar at a rapidly increasing rate.

From the drawing of the Silenite system of fixed spring lubrication reproduced herewith it will be seen that there is a Damperleaf of Silenite near the end of each leaf, between this leaf and the one above it. The Damperleaf is provided with an integral knob on its under side, which fits into a hole punched in the spring plate near its end. Hence the Damperleaf cannot move with relation to the spring plate on which it is supported and all sliding motion must take place between the Damperleaf and the spring plate above it, which latter is buffed on the under side where the Damperleaf rubs against it.

The effect is somewhat the same as though there were a layer of solid grease between the leaves near their tips. The trouble with ordinary systems of lubrication is that the lubricant will not stay in place and the high spots of one leaf will come into metallic contact with the high spots of the one above it, with the result that fluid lubrication ceases and the effects are those of dry friction. With the dry friction between steel plates, the coefficient of rest is very high, with the result that on comparatively smooth roads the spring acts almost like a solid bar, and it takes a considerable shock to break the hold between adjacent spring plates, which spoils the boulevard ride.

With Silenite Damperleaves, while the friction is high as compared with that between smooth steel surfaces with a layer of lubricant between, the locking action with the surfaces at rest is lacking, and it does not require a major shock to start the spring action.

One of the advantages of these spring inserts of Silenite is that they relieve the shock absorbers of a great deal of work. The inserts themselves act as shock absorbers or dampers as their resistance to motion is very high, and they have a decidedly favorable action in that the frictional work done at their surfaces increases with the load. With more passengers in the car the load on the springs is increased, the spring plates are pressed harder against the Damperleaves, and the force of friction is, of course, equal to the product of the coefficient of friction (which is substantially constant) and the pressure between the contacting surfaces. The damping action, moreover, increases not only as the load in the car is increased but also with increase in spring deflection due to shock, the greater the spring deflection, naturally the greater pressure against the Damperleaves and the greater the damping action they produce.

Easily Replaced

For the two longer Damperleaves positioned at the ends of the longer spring leaves where the sliding motion is greatest, a life of 25,000-30,000 miles is claimed. Any worn Damperleaves can then be easily removed ond new ones inserted by simply spreading adjacent spring plates apart by means of a screw driver. The shorter Damperleaves positioned at the ends of the shorter spring leaves where there is less sliding motion, have a life of 60,000 to 70,000 miles.

Springs provided with the Silenite system of fixed lubrication need no lubrication attention. The springs are finished by painting, which protects them against rust, or may be booted to exclude all grit and thus add somewhat to the above mileages.

Another important advantage claimed for the Silenite system is that it produces constant spring characteristics. In other words, interleaf friction is not influenced by time, weather, temperature or other factors. This means that the ride does not change and, moreover, shock absorbers can be tuned accurately at the factory to the spring characteristics with confidence that the factory adjustment will continue to give the best results, something that obviously cannot be done where spring characteristics are changing more or less continuously from one day to the next.

To summarize, the claims made for this Silenite system of fixed lubrication as applied to leaf springs are that it assures a very soft boulevard ride, a powerful damping control and stability on rough roads and on curves, a varying damping control to properly handle varying passenger loads, that it positively prevents squeaking of springs, that it relieves the shock absorbers of a great deal of work, thereby permitting lower adjustments and adding to their life, and that the damping action afforded by it is independent of weather conditions and does not change with time.

Ground Plane vs. Image Method

An experimental comparison of the ground-plane method and the image method of making wind-tunnel tests on automobiles has been made at the National Bureau of Standards and is reported in the December number of the *Journal of Research*. Concordant drag measurements were obtained when the leading edge of the platform in the ground-plane was faired and the test position was two model lengths behind the leading edge.

Die-Casting

This handsome front of Oldsmobile sixes and eights for 1935 is enhanced by a one-piece radiator grille die cast in zinc alloy. It is probably one of the most complicated die castings in the automotive field and weighs 17 pounds. The side mounted head lamps, new on Olds this year, are supported on die cast brackets.

Group of five zinc alloy die castings comprising the Hudson "Electric Hand." Die casting technique enabled Hudson engineers to pack a great amount of detail design into an exceedingly small compass. The two small castings are parts of the shifter lever.

Three interesting die castings used on the Chrysler Airflows. The grille at the top, left, is the mounting for the cylindrical parking lamp which is set in below the headlamp.

YEAR by year, die castings of the zinc alloys are assuming greater importance in the design of automobiles and automotive products of every description. The general improvement in zinc alloys as well as in the art of die casting have produced a marked advance not only in the familiar applications but at hitherto unexploited points, replacing a multiplicity of stampings and plain castings, with a consequent reduction in manufacturing cost.

The automobile shows this year offered a signal opportunity to chart the progress of this development. By far the most spectacular zinc die casting is the radiator grille for the Oldsmobile six and eight. Here is a one-piece casting finished in chromium plate, presenting a clean and very pleasing appearance. And it weighs 17 lb. Zinc die castings also are used on the hood louvers of both cars, the ones on the eight weighing 2 lb. apiece, thus utilizing at least 21 lb. of zinc alloys on these details alone.

The Olds grille is particularly striking for several reasons apart from its size and weight. In the first place, there is the technique involved in distributing the metal uniformly through all the grille sections over so large an area; and then is the additional care required to produce a surface finish which will take a fine chromium plate. That these objectives have been successfully attained is ample evidence of how far the die casting art has advanced in but a few years.

The use of die castings for radiator ornaments and hardware, of course, continues. On the Nash, the radiator ornament is finished in sections of chromium plate and enamel.

In many cases as on the Chrysler Airflows, Cadillac, LaSalle, Dodge and Buick, sections of the radiator grille or grille cross bars are die cast to improve appearance and facilitate assembly.

Lamp support brackets, tall and short, are die cast, notable examples being the Packard 120 and the Oldsmobile side mounted lamp. On the Graham, the tail lamp bracket and license plate holder are combined in one casting.

Several examples of small, attractive grilles serving various functions made their debut this year. We refer to the finish of the Pontiac fender guide lamps, the Dodge horn cover grilles, and the parking lamp housing on the Chrysler Airflow, illustrated here.

On hood louvers it has been found expedient to use die castings either for the entire louvre assembly or sections of it. Thus most jobs utilize a die cast section at the front end as on the Chrysler Airstream models.

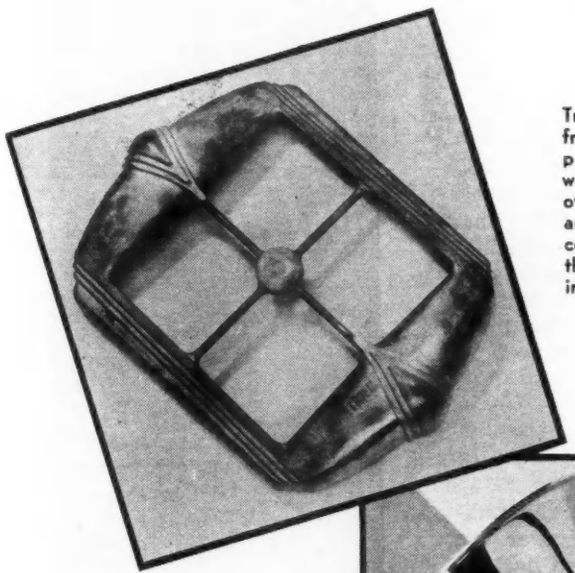
Another very interesting die casting is the radiator frame which is standard on all Studebaker models. Formerly this was a steel stamping but due to some corrosion effects which were found in service, a change was made to a zinc die casting, chrome plated. In addition to improved service properties, this casting is said to be lower in cost than the previous construction.

Die cast instrument panels and glove compartment doors have found favor on a few jobs. With the almost universal use of luggage compartments, we find hinges and lock cylinders fabricated of zinc alloy.

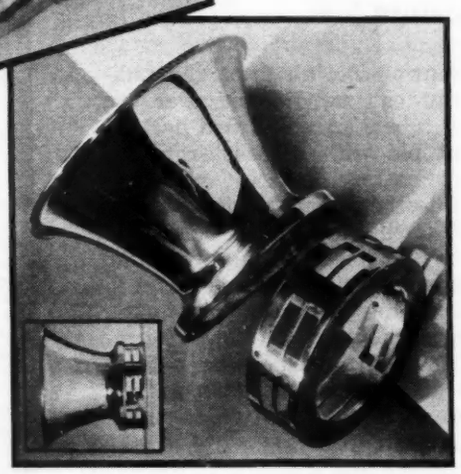
Among the novelty applications, particularly on accessory items, are the two-piece fire and police siren and the Tropic-Aire car heater body illustrated here. The heater body is a most interesting casting from the point of view of size, ornamental

Applications Continue to Increase in 1935 Models

by Joseph Geschelin
Engineering Editor, Automotive Industries



Tropic-Aire car heater frame is die cast for production economy as well as to make the most of decorative appearance. This frame is exceedingly light due to the possibility of working with very thin wall sections.



Two-piece siren for fire and police installations. Both the siren body and horn section are die cast in zinc alloy.

finish, and the extreme lightness of the piece due to the use of very thin sections. Another new accessory item is the Weidenhoff upper engine lubricator in which the metal head carrying the mechanism and serving as a mounting bracket is a die casting. Here, indeed, are excellent examples of the simplicity of design that may be achieved through the use of die castings, coupled with economy arising from the use of the minimum number of parts, little or no machining operations, and a reduction in assembly operations.

The Hudson "Electric Hand" which made its appearance this season makes most of the advantages of die castings. As shown here, the control end at the steering wheel is a die cast assembly comprising three fairly intricate housing elements as well as two very small castings which serve as the shifter lever. Not the least of the visible advantages of die castings for a mechanism of this kind is the ease with which important legends, lettering and instructions, can be cast in permanently and in bold relief.

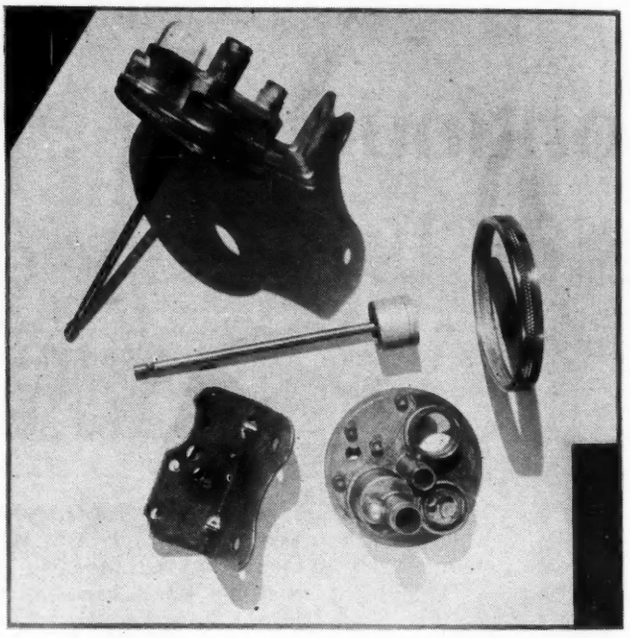
Here again is a good demonstration of the production economy made possible through the use of die castings, for these are compact and yet intricately cored parts requiring but little in the way of machine shop operations.

Remember that doggy steering wheel on the Studebaker, the one with four spokes each comprising a set of five steel rods. The hub of this wheel is composed of three die castings, two of these containing the grooves into which the four sets of steel rods are pocketed.

Perhaps the longest die casting to make its bow this year is the chromium-plated body molding which was applied on many of the Cadillac bodies. One can readily visualize the painstaking technique required to produce a casting of a piece so very narrow and yet so great in length by comparison. The brilliant effect produced by the molding certainly justifies whatever effort may have been expended on this detail.

This rather hurried high-spotting of the die casting applications in current production seems most significant in this respect: that die castings are finding wider use in automotive product design, far beyond the original conception of die castings as a suitable means of producing ornaments and hardware.

Obviously this change has come about, first, through the constant improvement of zinc alloys, leading to vastly better physical properties than ever before; second, improvement in die casting technique par-



Weidenhoff lubricator head is now a single die casting as shown at the top. The other parts show the separate pieces used previously, before it was made practicable to combine all details in a single unit.

ticularly in the way of intricate coring as a routine matter; and third, the development of better electroplating processes leading to superior finish not only in eye appeal but in resistance to wear and corrosion.

Automotive engineers may expect even more progress along these lines since we know that this particular field is in a constant state of flux due to continual research activity in service as well as in the laboratory.

Patents Accessory for Reconditioning Oil

A UNITED STATES patent (No. 1,981,089) was issued recently to Jesse J. Carpenter of Fort Worth, Tex., on an apparatus for reconditioning used oil. The patent covers an apparatus which is designed to be included in the lubricating circuit of an automotive vehicle. This apparatus comprises a filtering chamber and a settling chamber, the latter being suspended from the former by a tube. Cooling tubes are interposed between these two chambers, which convey the oil from the filtering chamber to the settling chamber, and a current of cool air from the radiator fan can be directed over the cooling tubes. An electrical heating element fed with current from the storage battery of the vehicle is built into the conduit which conveys the oil from the reconditioning apparatus back to the oiling system of the engine. A single thermostat controls both the current supply to the heating element and the flow of cooling air over the cooling tubes. Thus an oil filter and an oil-temperature regulator are combined in a single device.

What Happens When Metal is Cut

(*Continued from page 203*)

acteristic of relatively brittle work materials.

"In those cases where there is no apparent discontinuity of flow, as in the so-called "flow" type of chip, the built-up edge adheres to the face of the tool, and by virtue of its location assumes the function of cutting; thus relegating the function of the tool to that of cutter support. Any discontinuity, which may appear in the formation of the chip, will affect the life of the built-up edge; but it will form again as soon as the discontinuity disappears.

"The following factors act to decrease the magnitude of the built-up edge:

1. A decrease in chip thickness.
2. An increase in rake angle.
3. An increase in tool sharpness.
4. Application of lubricant to the tool face.
5. Increase in cutting speed.

"In heavy roughing cuts the built-up edge provides a protection for the extreme edge of the cutting tool, thus distributing the chip load over a greater area. On the other hand the existence of a large built-up edge permits the frequent escape of portions thereof underneath the cutting edge, thus producing a considerable erosion of this surface."

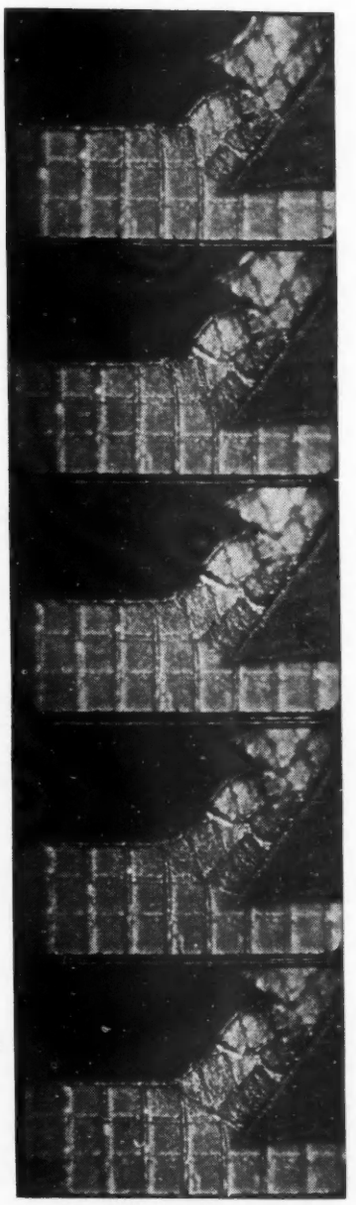
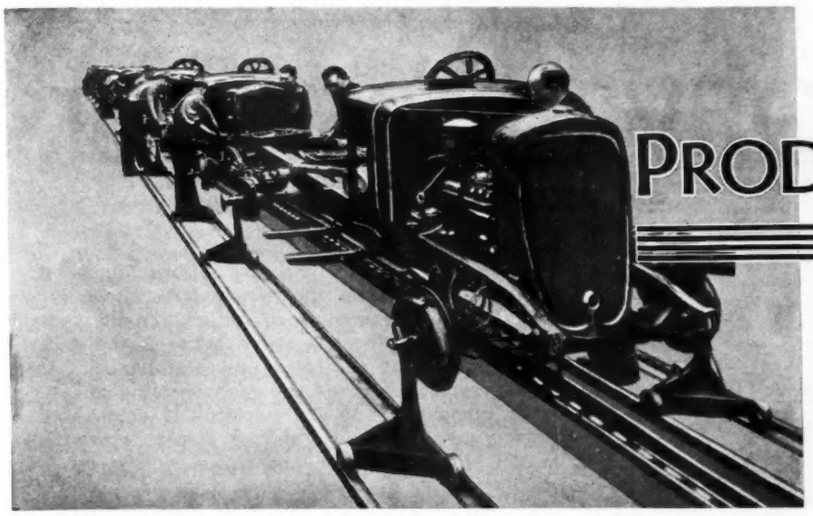


Fig. 4—A section of film showing a tool cutting copper-lead bronze



PRODUCTION LINES

Clean Plugs

Fifty-five thousand spark plug-cleaning machines were installed all over the country last year by AC Spark Plug Co., according to the confidential reports to jobbers this week. The use of this equipment not only inaugurated an unusual service to car owners, but increased the after-market for plugs over the totals set in 1929. According to grand averages, three out of every ten plugs serviced were replaced. AC is out to place at least 40,000 more cleaners in service during the coming year.

Body Hardware

Zinc alloy die castings continue to have an undisputed sway on body hardware, interior and exterior. We should have mentioned, in commenting on the 1935 Ford recently, that aluminum alloy hardware with anodic treatment is used by Ford only on deLuxe body jobs.

Carries On

From the ASM we learn that an unfortunate rumor has been spread to the effect that the U. S. Navy had abandoned the use of stainless steel in naval vessel construction. Apparently this rumor was based on the reports of failures at two points of—limited application — gasoline tanks and fire pipe lines where the metal is subjected to stagnant sea water and other corroding elements. At these points the use of stainless or corrosion-resisting materials has been abandoned. But the Navy carries on with the use of stainless steel sheet and plate in floors, partitions, deck houses, hatches, etc., where the metal is exposed only intermittently to sea water. Stainless is invaluable at these points, since it permits the use of extremely light superstructures, thus increasing the stability of naval craft.

Fifth Place

Aluminum stands today as the fifth metal, in point of volume produced and used, following after iron (and steel), copper, lead, and zinc. It is not so much the fact of attaining fifth place in the brief span of 44 years that is interesting, but the fact that in arriving at such a place in four decades this industry has successfully met a problem that confronts any new industry today: the problem of paying its way in a hurry, in the ever-increasing tempo of American business development.

Flying Yankee

Well, the New Flying Yankee, the Zephyr-type stainless steel train by Budd, built for the B. & M. and the Maine Central made its maiden trip last week in typical New England weather—amid flurries of wind and snow. Due to the fact that the right-of-way was clear only between Philadelphia and West Trenton, the Yankee didn't get a chance to attain its estimated speed of 110 m.p.h., although it did hit 100 on the icy rails. The big difference between this train and the Zephyr is in the G. M. influence. It is styled on the interior by the art and color director of G. M. Corp. and strikes a new high in elegance and comfort on the rails.

Auto Influence

Some high spots of the new Flying Yankee:—the coach seats styled by G. M. with upholstery in the Cadillac mode, soft, luxurious, with plenty of leg room; improved ride due to use of Houdaille shock absorbers, two per axle, eight per train, which eliminate all side sway at all speeds; automobile type windshield wipers including a very tricky two-blade unit on the curved window of the observation car. Winton eight-in-line Diesel used as before; it is lubricated on this job with Veedol.

Wood Graining

We have an inquiry from a foreign correspondent concerning the process of wood-graining finish on metal panels. Is this a proprietary process: is there more than one way of doing the job? Will any one interested in this matter give us some information. It may be of mutual benefit.

Cotton Fabrics

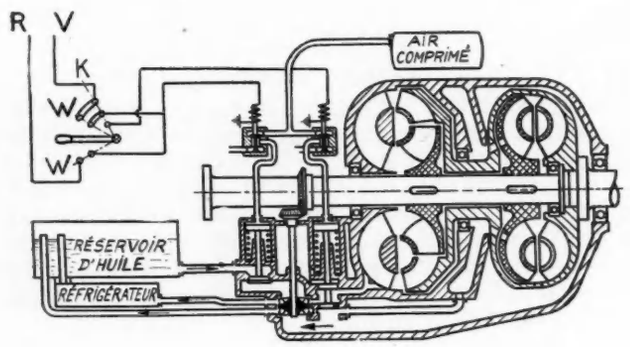
Whatever the engineer, research man, or purchasing agent may need to know about industrial cotton fabrics will be found in a new handbook from the pen of George B. Haven, textile research expert at Massachusetts Institute of Technology. Within the covers of this 538 page book, "Handbook of Industrial Fabrics," will be found a comprehensive treatment of the types of cotton, manufacturing processes, and uses of industrial fabrics. It also takes up the testing of fabrics together with laboratory design and the use of modern testing equipment. A large section is devoted to standard specifications and test methods, supplemented by many pertinent data tables in various other sections. The book is handsomely bound in limp leather and published by Wellington Sears Co., New York, at $2 a copy.—J. G.

MANUFACTURING MANAGEMENT METALLURGY

AUTOMOTIVE ABSTRACTS

A New Turbo Transmission

A NEW turbo transmission has been used in railcars built by the Austro-Daimler-Puchwerke of Austria. It is known as the J. M. Voith turbo transmission and is illustrated in section in Fig. 1 herewith. It comprises two hydraulic turbines of which the first is a true torque converter while the second is similar in principle to the Daimler fluid flywheel. The converter and the clutch may be



either empty or filled with oil. Starting with the pump which supplies them, they form two entirely different circuits.

In both of these circuits the motive power is transmitted by means of the liquid exclusively, and the connection is consequently very supple. When the two circuits are empty the engine crankshaft and the driving shaft are disconnected, and the car is then in position to "free-wheel" without any additional equipment. Under these conditions all of the liquid is contained in a special reservoir. It is delivered by means of a small pump, called control pump, to either the torque converter or the fluid clutch. The liquid may flow continually through the two circuits in such manner that these empty themselves when the arrival of new oil stops. The oil which flows out is returned to the reservoir by a second series of ports in the control pump.

When the control valve is in the "converter" position the fluid clutch is empty, and vice versa. On the delivery side of the control pump there is a small by-pass outlet which leads to the oil cooler. The cooled oil is returned to the reservoir.

Passage of the control valve from the "converter" position to the "clutch" position may be automatic. This operation may be effected also electrically. In the first case the operation is independent of all operating controls. In the second case the operation may be performed by operating controls of any kind whatever and even by controls on another vehicle. Electric remote control is simple and dependable because there are only two extreme positions of the control valve.

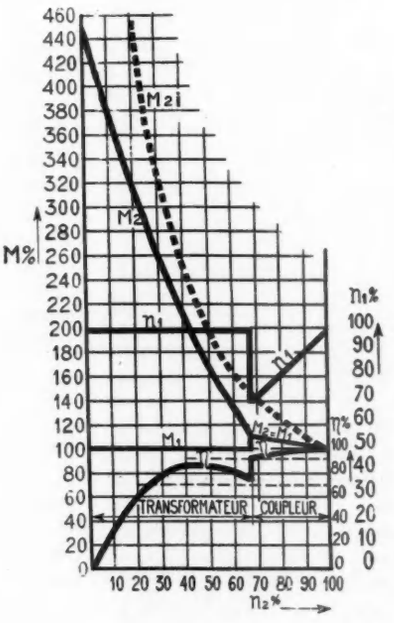
At the control station are located the engine accelerator, which is entirely independent of the transmission, and the control lever, which in the case of electric control may be used for reversing as well as for the changeover from the torque converted to the fluid clutch position. In general, for a given control station, the direct drive through the fluid clutch is used only for forward motion. In the neutral position of the control lever a valve between the control pump and the reservoir is closed and both circuits then empty themselves, which gives the free-wheeling effect.

The Voith turbo transmission permits of connecting a number of engines in parallel and of disconnecting them at will, even while under way, and this arrangement even has become customary.

The power and efficiency are plotted in the accompanying graph, Fig. 2, on a basis representing the speed of the driven shaft. M_1 is the torque of the driving shaft and n_1 its speed. The torque M_2 is that available on the driven shaft. When the control is in the "torque converter" position and the speed of the engine is reduced, the speed of the driven shaft decreases in the same proportion, while the driving and driven torques vary as the square of the speed, the efficiency of transmission remaining the same. When the device functions as a fluid clutch the secondary torque is of course always the same as the primary torque.

As a rule, the torque of a gasoline engine increases slightly when the speed drops. This is noticed particularly if the engine speed is reduced in passing from the "converter" position to the "clutch" position. This point of the secondary speed is located exactly there where the curve M_2 intersects the curve of M of the clutch. For the sake of comparison, the curve corresponding to an efficiency of 100 per cent and an ideal torque M_2i has been dotted in.

For speeds of over 65 per cent of the maximum only the fluid flywheel operates, and the efficiency is then between 95 and 100 per cent. Over about 90 per cent of the total mileage the clutch is used, and the efficiency of the converter therefore affects only 10 per cent of the running. In assuming the efficiency of the clutch to be 97 per cent and that



of the converter 80 per cent, the mean efficiency would be 95.3 per cent for the whole run. This calculation, however, does not apply to cases where the railcar has to make a stop every two or three miles.—M. H. Jouffret in *SIA Journal* for November.

New Fiat Railcars Have Two Diesels

A NEW model of its Littorina railcar was submitted for tests to the Italian State Railways by Fiat recently. It is similar in design to previous models but carries two high-speed Diesel engines instead of gasoline engines. The seating capacity is 56, and there is room for several "standees" on both platforms. The car is supported on two four-wheeled trucks, each truck carrying its own powerplant and transmission. Only one axle of each truck drives. In the design of the powerplant particular attention was paid to accessibility and ease of service, and all grease cups are located at the ends of the trucks. Axles are of chrome-nickel steel and the brakes act on drums on the wheels, being applied either by hand or by means of compressed air.

The engines have six cylinders of 4¼ in. bore and 6 in. stroke and develop 75 hp. at 1600 r.p.m. Centrifugally cast liners are inserted into the cylinder block. The camshaft is driven by a silent chain which also drives the injection pump and governor. A torsional vibration damper is fitted to the crankshaft. Fuel is delivered to the injection pumps by means of two electric diaphragm pumps which can be operated either separately or in parallel. Fuel sufficient for 670 miles can be carried in the tanks. Speed control is by means of a pedal which acts on the centrifugal governor through the intermediary of an air cylinder.

Power is transmitted through a friction clutch, a four-speed gearbox, a free-wheeling unit, a reversing gear, and a final drive gear in the housing of the driving axle, which is lubricated by means of a pump enclosed in the housing. Throttle, clutch, transmission, free-wheeling unit and reversing gear are all controlled by means of compressed air, a two-cylinder compressor being mounted on the side of each gearbox and driven through the secondary shaft. Brakes are applied by means of a lever on the control box in the driver's compartment, the necessary air being supplied from a separate tank.

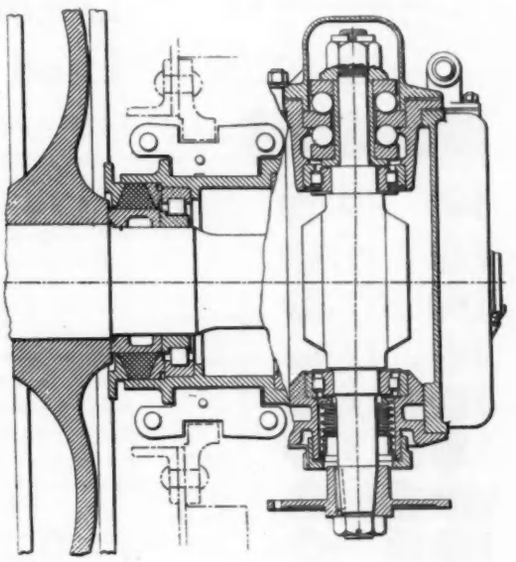
Overall dimensions of the new Littorina are 57 ft. 9 in. (length) by 7 ft. 10¾ in. (width) by 10 ft. 3½ in. (height). The distance between centers of trucks is 39 ft. 8½ in. The car weighs 19½ tons empty and 26.35 tons with a full complement of passengers. The wheel diameter is 36 in. The final drive ratio is 2.44, the maximum speed on level track 42 m.p.h., and the average fuel mileage 5.2 per U. S. gallon.

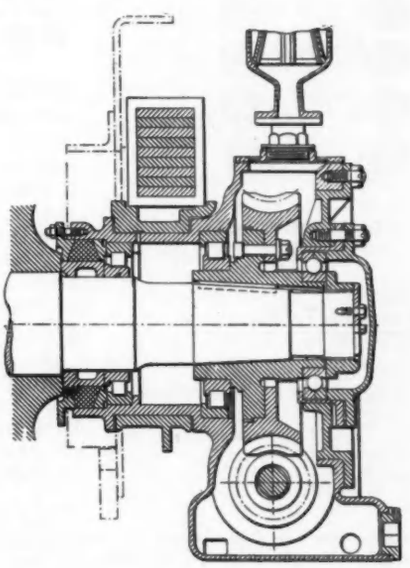
Fiat also has built for the Italian State Railways a number of freight units for the rapid transportation of perishable goods to market. These are similar in general design to the Littorina but have only one power truck, which latter is equipped with a 120 hp. gasoline engine.—*Motor Italia*, November.

Twin - Engined British Railcars

SOME twin-engined railcars of 260 hp. have been furnished recently to the Great Western Railway of England by the Associated Equipment Co., the manufacturing subsidiary of what was formerly known as the London General Omnibus Co. No body space is occupied by the engines or other portions of the driving mechanism, the whole of which is located below floor level. On one side the drive consists of a 130-hp. Diesel engine, mounted slightly ahead of the center line of the chassis and driving a four-speed Wilson preselective gearbox, from which the drive is taken to a constant-mesh reverse box. From the latter the drive is continued to worm gearing mounted in the axle box at one end of the inner axle of the rear bogie, and this in turn is connected to a similar drive on the outer rear bogie axle. The drive on the other side of the chassis is similar, except that the preselective gearbox is omitted and only the inner axle of the front bogie is driven, sufficient adhesion for the reduced torque being provided by one axle. Power is transmitted from the engine to the reduction gears through a fluid flywheel.

The engines are the A.E.C. Diesel engines, of the six-cylinder type, with 4½-in. bore and 5 9/16-in. stroke. They operate at maximum speeds of 2400 r.p.m. and between 600 and 1500 r.p.m. deliver a b.m.e.p. of 100 lb. per sq. in.

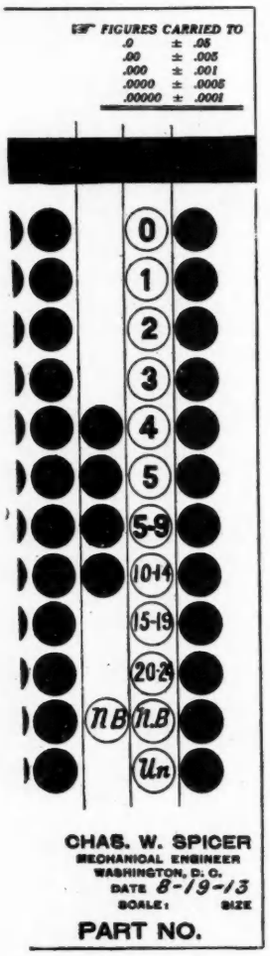




or over The weight, complete with flywheel, electrical equipment, and other essential accessories is under 1500 lb. The length of the car is 63 ft. 7 in. over buffers; it is carried on two four-wheel bogies spaced 40 ft. apart. The ratio of the worm drive is 3.12 to 1 and the four speeds in the transmission have ratios of 4.5, 2.53, 1.64 and 1 to 1.

The driving units are supported on cantilevers on the outside of the frame, which latter is comparatively narrow, so that no part of the mechanism is inaccessible from the outside. The main part of the car accommodates 40 passengers, the rest of the available space being given over to a combined driver's and baggage compartment at one end and a buffet and small driver's compartment at the other end. In practice the car is started up on one engine, the second engine being started after the car is moving.—*Engineering*, Jan. 11, 1935.

The Forum



Decimal of Inch System Used Twenty Years Ago

Editor AUTOMOTIVE INDUSTRIES:

I was interested in the article on the Ford decimal system for drawings, which appeared in the Dec. 15 issue. I used this system for about 20 years and found it quite satisfactory, except when drawings were to be used in woodworking shops for which use I was compelled to make special drawings or sketches dimensioned in fractions. This was considerable bother on some classes of work, and I finally abandoned the system, except for use in my own shop, where it worked first rate, and, of course, the Ford shops will make it work all right.

I used to have all my tracing sheets printed as shown by the enclosed clipping, which, you will note, gives the desired tolerances on each sheet without cluttering up the face of the drawing with these additional figures, but the draftsman must exercise care in dimensioning or at times there will be shafts that will not turn in their bearings, and complications of that kind.

CHAS. W. SPICER.

DePaolo Explains the Hitler Report

Editor AUTOMOTIVE INDUSTRIES:

In regard to your Nov. 10 issue, I notice an article concerning myself, one in which Mr. H. Nordhoff of Mainz, Germany, contradicted a story I gave out in connection with my participation in the last Avus race on May 27.

I have duly answered Mr. Nordhoff's article and am enclosing a copy of this letter to you, which is self-explanatory.

As I mentioned in my letter to Mr. Nordhoff, I regret very much having even mentioned the incident, not knowing whether the story given me by the young German fellow was authentic or not.

I might add, Mr. Editor, that Mr. Nordhoff is wrong when he mentions the fact that "nobody, not even de Paolo, saw any connecting rods hurtle." True, I could not see the rods go, but after my car came to a stop there was a large hole in my Miller crankcase where two connecting rods had flown out. And whether they hit Adolf Hitler or the lumber in the grandstand I cannot say, but I know the rods were missing when I stopped. This put me out of the running in the Avus race, representing the U. S. A.

PETER DE PAOLO.

Excerpt from Mr. De Paolo's letter to Mr. Nordhoff:

"Shortly after my misfortune when my motor failed, a young man approached and gave me the story which was published in the Sept. 15 issue of the *Automotive Industries* magazine. I had little belief in the story at the time it was given to me, not even knowing Adolf Hitler was present. The only outstanding introduction in my mind on the morning of the race, prior to the start, was to Mr. Obergruppenfuhrer Huhnlein.

"On many occasions, young men have approached me, either before or after the race, with a line of conversation, with the thought in mind that they can tell their fellow-men that they have had a talk with a racing driver, or to get an autograph. It is my belief, Mr. Nordhoff, that this young man belonged in this category and I regret very much having even mentioned the incident, and offer my most sincere apologies."

Rear Steering and Car Stability

Editor, AUTOMOTIVE INDUSTRIES:

On page 478 of Oct. 20 *Automotive Industries* Mr. Crane gives an incorrect impression of rear-engined cars by referring to the fatal accident of the Dymaxion car in Chicago. In spite of having a rear engine, the car carried its weight principally on the front wheels, due to body overhang. It had a single rear wheel, and steered by the rear wheel. Analysis shows that, aside from weight distribution, rear steering is favorable to spinning, and that rear steering is unstable with positive or negative caster.

E. R. MORTON, M.E.

It is possible that in our report of the meeting we did not quote Mr. Crane absolutely correctly on this particular point, but we remember that in referring to the accident he did so very guardedly, not ascribing it to any particular feature, but mentioning that the car involved had some of the features advocated by those who would radically change the present general arrangement of passenger cars.—EDITOR.

Hour Limitations No Aid to Employment Increase or Regularization, AMA Says

Man-hours of available employment are not increased by limiting the number of working hours and regularization of employment is adversely affected through hour limitations by increasing the proportion of part-time workers, the AMA has told the National Recovery Administration in a "question and answer" brief covering the subject of employment provisions in automotive codes and the NRA's policies on such matters.

The brief was filed this week by the AMA in connection with the public hearing which opened Jan. 30 in Washington on code employment provisions. When the Recovery Board scheduled the hearing on the employment provisions, it listed the questions which would be discussed, and the AMA's brief is its formal answer to these questions.

The questions and answers, briefed, follow:

How has limitation of hours affected the volume of employment?

Limitation of hours does not increase man-hours of employment available, but merely spreads them over more workers. Due to seasonal conditions, this has increased the number of temporary workers having a small amount of employment during the year and prevented regular workers from getting as satisfactory annual earnings as they otherwise would have received.

In 1934, AMA members built 1,977,511 vehicles and provided 280,368,161 man-hours of work, distributed among 166,119 employees (an average of 1685 hours per man equivalent to 42 weeks of 40 hrs.). In 1929 the same companies built 3,470,142 vehicles and gave 466,002,955 man-hours of employment to 198,202 workers (an average of 2300 hrs. per man).

How has limitation of hours affected regularization?

It has adversely affected regularization by increasing the proportion of workers employed for only short periods during peak production.

How has limitation of hours affected unit costs of production?

It has increased them by making it necessary to hire short-term employees, thereby increasing hiring and training costs, increasing supervision, and resulting in a greater spoilage of material and breakage of tools, etc.

Should the maximum work week be reduced, maintained, or increased generally, by groups of industries or separately by individual industries?

It should not be less than 48 hrs. per week in the automotive industry, because even that limit reduces annual earnings of workers by increasing number of short-term employees.

Is the degree of flexibility in hours provided by such provisions as overtime, peak periods, averaging, etc., inadequate, adequate or excessive?

Inadequate at least for some manufacturers and some plants at certain times. Need for more flexibility appears greatest among custom builders and other small manufacturers. It is essential that averaging be done annually.

Do the present provisions work as well as any other method or methods that can be devised?

They do not work as well as greater flexibility.

What effect has the limitation of hours had on hourly, weekly and annual earnings?

It has reduced average annual earnings as in most other industries. Average hourly wages were 57.6 cents in April, 1933; 71.8 cents in 1929, and 76.7 cents in December, 1934. Weekly earnings are higher than in the spring of 1933, but annual earnings have been reduced by the hour limits.

What standard should be followed in establishing minimum wages?

Should not be so high as to force prices to the point that sales are curtailed, thereby reducing employment.

Are present minimum wages satisfactory from the point of view of such standards?

To answer this question, consideration must be given to entire economic structure, giving due weight to wages in other industries and to price levels and relationships.

What has been the relation of changes in hourly, weekly and annual earnings to changes in the cost of living?

Hourly rates in December, 1934, were up 30.7 per cent from April, 1933, and weekly earnings up 29.6 per cent, as compared with increase in cost of living of 9.6 per cent.

Are provisions such as several basic minimum wages, classified wage scales, or other methods of maintaining wages above the minimum desirable?

No. The fact that the average hourly rate is 77 cents against code minimum of 40-43 cents proves that such provisions are unnecessary.

What is the effect of wage provisions on costs and volume of consumption?

They increase costs and when prices were increased last spring to cover these increases, consumption decreased until prices were reduced.

How should piece work rates be adjusted to code rates?

Piece work rates are considerably above code minimums.

Are wage and hour provisions desirable as temporary or permanent measures?

As temporary measures only.

What effect do standard wage and hour provisions have on establishments varying in size and in degree of mechanization?

They work a greater hardship on smaller manufacturers. It is likely that they stimulate mechanization among stronger companies and hasten the demise of smaller companies which cannot finance mechanization.

What should be done to meet the problem of overlapping definitions, multiple code coverage and competing industries?

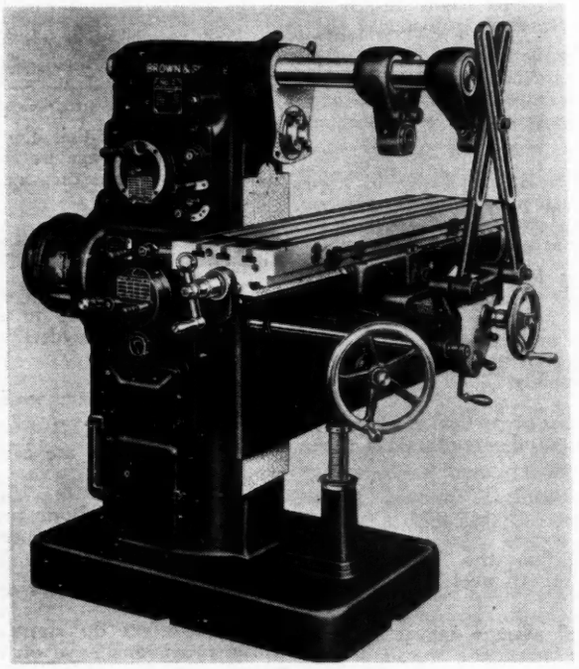
A plant should operate only under one code and segregation by codes should be based on finished products.

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Plain Milling Machine

Brown & Sharpe Mfg. Co., Providence, R. I. has added the Light Type No. 2 Plain Milling Machine designed to offer unusual value where the work is of the lighter class. Contrary to the trend toward increased size and weight with added horsepower, etc., this machine might properly be termed "a simplified machine," permitting sensitivity and easy handling while insuring rigidity and accuracy.



Spindle height has been lowered to give a more convenient height for vision of cutters and work by the operator. The correspondingly lower height of the table brings about easier handling.

The machine is a completely self-contained motor driven unit, flanged type motor being employed with motor pinion meshing with internal gear of the main driving shaft. Motor runs only when machine runs and is started by the regular machine starting lever. This lever also serves to apply the brake for quick stopping.

A wide range of speeds has been provided to meet a variety of requirements, the speeds being arranged in two series, giving 16 spindle speeds from 40 to 1300 r.p.m. Changes are made by convenient rotating lever on the side of the column in conjunction with back gear and high and low series lever, one-quarter revolution of the rotating lever giving a change in speed in the series engaged. Convenient single lever feed control is also provided for the 16 feed changes from ½ in. to 18¼ in. per minute, one revolution of the lever giving a change in feed rate. All feeds can be disengaged by placing the feed lever in "locked" position, thus preventing accidental engagement of feeds when power feeds are not required when drilling, boring, etc.

To the general usefulness of the machine has been added a universal milling attachment with crane, furnished as extra, which permits the attachment to be swung to the side of the machine when not in use, yet instantly available. The wide range of the adjustment of the attachment, together with the speed range from 82 to 2672 r.p.m. provides a means of handling a great variety of work requiring shell end mills from approximately 2¾ in. diameter to the tiny end mills used in mold and die work.

Another feature is the provision for obtaining short leads and fine feeds by the use of a short lead and feed reducing attachment furnished as an extra which is driven from the table feed screw. This attachment permits extremely fine feeds and may also be used with the universal index centers and universal milling attachment for obtaining short leads.

A vertical milling attachment can be furnished which clamps to the overarms and is adjustable horizontally. Also 10 in. and 18 in. hand feed rotary attachments and 18 in. power feed rotary attachment which is driven from the table feed shaft can be furnished as extras for this machine.

Capacity of the machine is longitudinal feed, 28 in. transverse feed, 10 in. and vertical feed, 15 in., all automatic. Net weight of the machine is approximately 2400 lb., including 3 hp. motor which is standard equipment.

New Blue Print Paper Claimed Not to Bleed

A new blue print paper and a new blueprint cloth, for which it is claimed that they will not "bleed," have been developed by the C. F. Pease Co. of Chicago. The improvement in the paper and cloth has been made possible by the development of a new sensitizing solution.

It is claimed that with the new Pease "K" speed paper or cloth, prints may be fully exposed and still a deep lustrous blue produced, with the whites standing out clean and clear in sharp contrast. The fact that the paper may be over-exposed and still produce perfect prints, means that it will accommodate practically all classes of tracings at one printing speed, and the operator need not worry if he misjudges the correct printing speed. Also, the paper is slower printing than the ordinary papers, which enables the operator to get the best out of it, since it will produce striking blue and white contrasts at any printing speed within its range. The new K speed paper and cloth are also color fast and are claimed to produce the nearest non-fading prints that it has been possible to obtain so far.

Cloud and Pour Test Apparatus

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., has designed a four-compartment "cold-test" apparatus to meet the latest A.S.T.M. cloud and pour test specifications (Serial D 97-34) for lubricating oils. These specifications require a minimum of three cold test baths, four being preferable, which must be maintained at the following temperatures:

1—Temperature +30 to +35 deg. F.
2—Temperature 0 to + 5 deg. F.
3—Temperature −30 to −25 deg. F.
4—Temperature −60 to −55 deg. F.

The compartments of this newly designed TAG apparatus are copper-lined and well insulated with 2-in. cork on sides and bottom, making them separate cooling units. In each compartment there is an assembly of four metal jackets, mounted on a substantial metal tripod, for supporting the cold test jars and thermometers in accordance with A.S.T.M. specifications. This is the same assembly which has been used heretofore in the TAG single-unit cloud and pour test apparatus.

Seapak Insulation Broadens Applications

Seapak insulating material for autobodies, made by the Seaman Paper Co., Detroit, Mich., which was described in *Automotive Industries* a short time ago, has found broad application since its introduction.

Following is a list of points at which this material has been applied:

1. Dash insulation—three layers of Seapak mounted on a waterproof board. Serves the dual function of heat and sound insulation and permits the alignment of holes and slits for mounting.
2. Cowl—one layer cemented to cowl top and sides.
3. Top—on steel roof construction cemented over the entire surface between carlins for damping. Provides sound absorbing and heat insulating surface.
4. Panels and doors—one layer for sound dampening vibration on panels; one layer, asphalt coated on door panels for quiet closing and to provide a waterproof watershed.
5. Floors—one layer on the front floor, two layers on rear floor; also two layers, covered with asphalt paper on seat pans.
6. Seat back and foundation boards—recommend Seapak instead of wadding under upholstery for sound absorption.
7. Carpets and mats—applied to give cushioning effect and as aid in sound and heat absorption.

Improved Shaft Press

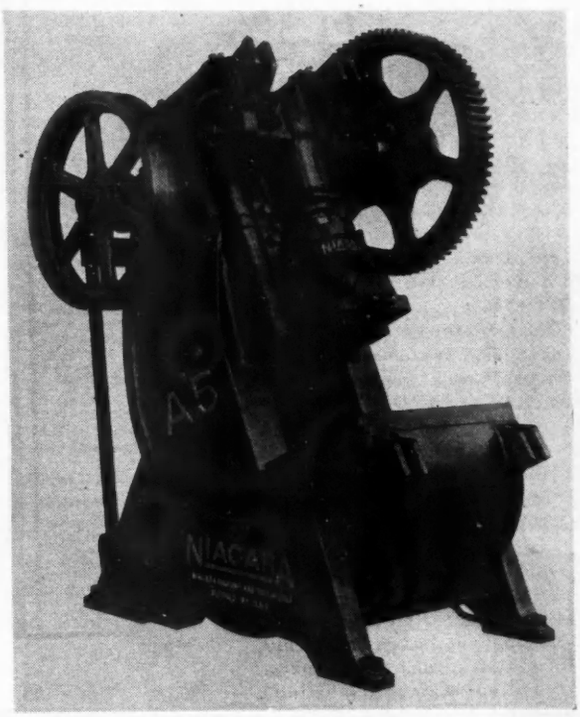
The Niagara Machine and Tool Works, Buffalo, N. Y., has just brought out an improved 5-in. diameter shaft press. The No. A-5 press has, among its many improvements, a one-piece, steel casting frame designed to not only have a high factor of safety but to have maximum rigidity vertically, horizontally and torsionally, and to provide rigid gib mountings.

The press is equipped with a six-point engagement pin clutch, said to provide more prompt engagement, more strokes per minute, and contributing to safe operation because the greater number of engagement points eliminate lag, thus enabling the press operator to synchronize his feet and hands. This clutch is also provided with a safety stop to prevent repeating through overtravel of the shaft.

The brake is equipped with a spring that automatically compensates for expansion due to heat of operation, as well as automatically compensating for wear. The brake block and brake band are marked with suitable marks to indicate correct adjustment.

The slide, like the frame, is extremely rigid and strong to maintain accuracy, to provide suitable mounting for dies and to promote longer die life. It has an unusually generous support for the die, especially from the center of the slide forward.

A new "Breech Block" type of die clamp is use. This "Breech Block" die clamp is cylindrical in shape and is ground to close tolerance. It fits in a smooth bored hole, the center of which is sufficiently above the bottom of the slide to prevent it from sagging. Being contained within the slide, it has no vertical play and gives solid support to the die under pressure.



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Get Your Share of 80%

Here's When The Automotive MAINTENANCE Dollar Is Spent

MONTH	Percent of Year's Maintenance Business
January	5.5%
February	4.8%
March	7.5%
April	10.4%
May	11.3%
June	11.2%
July	8.7%
August	8.6%
September	8.6%
October	9.0%
November	7.9%
December	6.5%